

Madras Manual of Geography



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THE

MADRAS MANUAL

OF

GEOGRAPHY

WITH 92 MAPS AND 85 DIAGRAMS AND ILLUSTRATIONS

34

BY

GEORGE PATTERSON

Late Prof. of History and Political Economy in the Madras Christian College
and Fellow and Examiner of the University of Madras

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PREFACE

THE name of this book, the *MADRAS* MANUAL OF GEOGRAPHY, has been adopted not to indicate any exclusive suitability for use in that Province, but to distinguish the book from a totally different one issued by the same Publishers, the well-known *Manual of Geography, Physical and General*. The present volume is intended mainly for use in India, and the Indian Empire is therefore treated with much greater fulness than any other country. It will be found to meet the requirements of every Indian University and to be suitable for use in every Province.

In the arrangement of the book the excellent, but in these days much forgotten, rule of Dr. H. R. MILL, that the teaching of Geography should proceed from the general to the particular, has been kept steadily in mind. Each continent is accordingly first described *as a whole*, in view of the broad physical characteristics and conditions which make it what it is. The same course is also followed with some of the chief countries. These "general views" should be studied carefully (with the aid of a good Atlas, and with constant reference to the chapters on Physical Geography at the beginning of the book) before any other parts are read. In the treatment of the different States and Provinces undue detail has been carefully avoided. A multitude of places named in most geographical handbooks will not be found here. A Geography is not a *Gazetteer*, and in so far as it is made, one the peculiar interest of geographical study is lost. Only such places as are directly connected with the historical, social or economic life of each country or people are named at all.

For many valuable hints the Author is indebted to various German geographies, particularly those of SEYDLITZ, NEUMANN and KIRCHHOFF. In general style, and lucid scientific presentation, some of these books are, in his opinion, models of what

a geography ought to be, and greatly excel anything yet published in English. By the courtesy of Messrs. F. HIRT u. SOHN, of Leipzig, he has been permitted to reproduce several of the diagrams used in Prof. SEYDLITZ's books. The English works that have been of use are very numerous. The *International Geography* (edited by Dr. MILL), CHISHOLM's larger *Commercial Geography* (1908 edition), BARTHOLOMEW's *Atlas of the World's Commerce*, and Vol. iii. of the same Author's *Physical Atlas* (dealing with Meteorology) have been constantly referred to. The last magnificent volume is a mine of information which it is almost impossible to obtain elsewhere. For the Indian Empire Col. HOLDICH's *India*, and the early volumes of the revised edition of the *Imperial Gazetteer* now in course of issue from the Oxford Press, have been of the greatest service. For statistics the latest official publications of each country have, wherever possible, been consulted: where this was not possible the figures of the *Statesman's Year-Book* (1908) have been accepted.

For the spelling of Indian proper names there is as yet no uniform and generally accepted system. In almost all cases the spelling used in the new edition of the *Gazetteer* has been adopted. For other names the rules of the Royal Geographical Society have, in the main, been followed.

G. P.

LONDON:

February 9th, 1909.

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ERRATA

- Para. 35, lines 4 and 5 from end, *for* 70° 16' *read* 77° 15'
- „ 320, line 8, *for* rule of King *read* rule of the King.
- „ 349, last line, *for* 327 B.C. *read* 326 B.C.
- „ 372-379 *passim*, *for* Rājputānā *read* Rājputāna.
- „ 392, line 3, *after* south *insert* of the Narbadā.
- „ 403, line 5, *for* 1766 *read* 1765.
- „ 413, line 3, *for* 1688 *read* 1668.
- Page 228, Fig. 110, *for* Age Tinrur *read* age of Timur.

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THE MADRAS MANUAL OF GEOGRAPHY

INTRODUCTION

DEFINITION AND SCOPE OF GEOGRAPHY

1. The word GEOGRAPHY is derived from two Greek words, *gē*, the earth, and *graphē*, a description, a picture. The science of Geography may therefore be briefly defined as *a description of the earth*. Such a definition is, however, far too broad and general, and needs to be limited in several directions. Geography treats of the earth *in its relation to the human race*, and is therefore concerned with it only *as it now is*, and mainly also with its *surface*. How the earth came to be as it now is, its structure and the substances of which it is composed, belong to the sciences of Astronomy, Geology and Chemistry. In its description of the earth's surface as the abode of man, Geography has to draw its materials from all these sciences, as well as from Meteorology, Botany, Zoology, Anthropology and History. According to the point of view from which the earth is regarded Geography has been divided into (1) Mathematical, (2) Physical, (3) Political, and (4) Commercial Geography.

2. **Mathematical Geography** views the earth as a planet, and explains its shape, size and motions, and its relations to the Sun, Moon, and other heavenly bodies. Mathematical Geography is so called because like the science of Astronomy from which it is derived, it is precise and mathematical in its methods. It gives us the data whereby accurate measurement and delineation of the earth's surface is possible

3. **Physical Geography** treats of the natural phenomena of the earth's surface, its land and water, the atmosphere, the movements of air and ocean, the distribution of life, and of all the natural forces which have made the earth's surface what it is and are continually modifying it.

4. **Political Geography** views the earth as divided among nations. It treats of the distribution of political power, the boundaries, populations and resources of states and empires. It is closely related to history, and when it treats not only of the present political distribution of the earth's surface but of the past also, and traces the gradual growth of empires, it becomes **Historical Geography**.

5. **Commercial Geography** describes the animal, vegetable and mineral products of each country, their development by the labour of man, and the growth and condition of industry and manufacture. It traces also the routes and means by which these products are distributed and exchanged.

6. These, however, must not be regarded as different sciences; they are really different aspects of the same science and cannot be entirely separated. Political and Commercial Geography are closely related. Commerce is the greatest of all sources of wealth and political power, and, on the other hand, nothing so promotes commerce as a strong government under which men can live in peace and security. These, in their turn, are both dependent upon the physical condition of the earth. For not only is the wealth of every country ultimately dependent upon the generosity of nature, but—what is still more important—the character and energy of man are more determined by *climate* than by any other external influence. It is noteworthy that all the great empires of antiquity had their origin in the temperate or sub-tropical regions of the earth. No mighty empire could ever have its headquarters in the Arctic regions, nor could the sandy wastes of the Sahara ever be the centre of a great commerce. Finally, the physical condition of the earth is due mainly to its position and movements in relation to the heavenly bodies.

7. In its common signification Geography includes more or less of all these branches. In its description of the earth it takes account, first of all, of the great natural divisions of land and sea, continents and oceans, etc. In its fuller treatment of the land it proceeds on the lines of political division,

which are by no means always natural, and deals with the position, extent, population, resources, etc., of different States. All through, however, and as a matter of prime importance, it explains the various physical conditions which make both land and people what they are. Upon these physical aspects almost all the rest directly or indirectly depends, and if they are lost sight of Political or Commercial Geography become little more than a mass of dry and uninteresting facts and figures.

MATHEMATICAL GEOGRAPHY

8. **Shape and size of the earth.** Those who live near the sea know that when a ship is approaching the land we see the top-sails first, then the masts, and, last of all, the hull.



Fig. 1.

When it sails away the hull first disappears, and after that has sunk below the horizon the masts still remain visible. This is one of the simplest and most familiar proofs that the earth is round. A still more convincing proof is found in the fact that a ship may sail in an easterly or westerly direction, never turning back at all, and yet arrive at the port from which it started. This would be impossible unless the earth were round. A ship making such a voyage plainly circumnavigates the globe. The roundness of the earth is also made actually visible in an eclipse of the moon. Such an eclipse is caused by the moon passing through the shadow of the earth, and as the shadow creeps across the moon's disc it is seen to be the shadow of a round body.

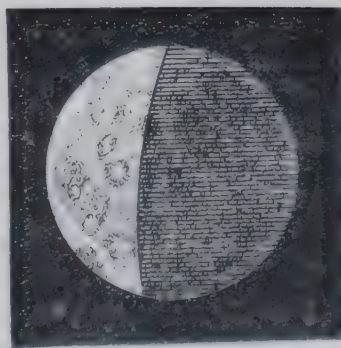


Fig. 2. Showing the shadow of the earth in a partial eclipse of the moon.

9. The shape of the earth can, however, be determined with the greatest accuracy by observation of the stars. The stars are so distant from the earth (the nearest of them being many thousand times as far away as the sun) that their rays as they reach the earth are practically parallel. If, therefore, accurate observations of a particular star be taken at the same moment at two places some distance apart, we are able to calculate the amount of curvature of the earth's surface between the points of observation, and, provided the distance between the two points is known, to determine the size of the

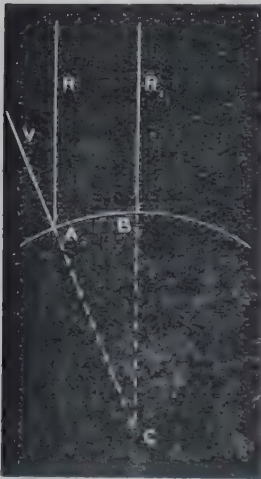


Fig. 3.

circle of which it forms a part. Fig. 3 will make this plain. A and B are two places from which a given star is observed, the distance between A and B having first been very carefully measured. R and R' are the parallel rays of the star. At B the star is right overhead and its rays coincide with a vertical line. At A the vertical is shown by the line VA, and with this line the rays of the star are observed to make the angle RAV. Now, if this angle be accurately measured, and if AB (whose length we know) be a segment of a perfect circle, then it is easy to calculate the whole dimensions of the circle, for the angle

RAV is equal to the angle at the centre of the circle subtended by the arc AB. This will be seen if the vertical lines are produced till they meet at C, the centre of the circle. Then, since RA and RC are parallel lines and are met by the straight line VC, the angles RAV and ACB are equal. Therefore the arc AB sustains the same proportion to the whole circumference of the circle that the angle RAV sustains to four right angles.

10. Now if the earth were a perfect sphere, that is if it were absolutely round so that every circumference were a perfect circle, the same degree of curvature would be found in every part of its surface. But this is not so. Near the poles it is found that an arc of a given length subtends a smaller angle than an arc of the same length near the equator. In other words it is a segment of a larger circle, and has therefore

a slighter curvature. Fig. 4 shows this in an exaggerated fashion. This proves—and the fact may also be proved in other ways—that the earth is not a perfect sphere but is slightly flattened at the poles.

11. Astronomical observations make it possible to measure the earth with great accuracy. The greatest diameter is at the equator and is 7,926 miles: the polar diameter is about $26\frac{1}{2}$ miles shorter than the equatorial diameter. The

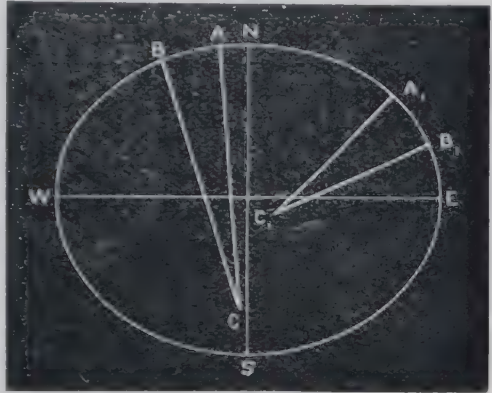


Fig. 4.

circumference at the equator is 24,899 miles. The area of the surface is about 197 million square miles.

12. The motions of the earth. In describing the earth's motions it will be necessary to use certain scientific terms which may be advantageously explained at this point.

13. A Plane is a perfectly flat area. As a line is defined as length without breadth, so a plane is length and breadth without thickness or curvature. A body is said to move in a plane when its motions are such that if straight lines were drawn from the position which it occupies at any moment to all the other positions which it successively occupies, these lines would together form a perfectly even and flat surface. A ball rolling on a table would thus move in a plane, equally so whether the table were horizontal or were tilted up at one side, for a plane may incline in any direction.

14. Measurement of Angles. From very ancient times the circle has been divided into 360 degrees ($^{\circ}$), the degree into 60 minutes ($'$), and the minute into 60 seconds ($''$). If a circle be divided into four equal parts by two straight lines drawn through the centre, the two lines will cut one another at right angles, and the four angles thus made will each contain 90° . Any angle may thus be measured in degrees, and the number of degrees remains the same no matter how large or how small the circle may be which is supposed to be drawn round it.

15. Angular Distance is distance on the circumference of a circle measured in degrees. Without any knowledge of the actual size of a circle we can define the relative position of two points upon it by saying that the distance between them is so many degrees. If we know the size of the circle we can then easily convert degrees

into inches or miles as the case may be. Thus if a given circle be 24 inches in circumference, two points 30° apart are $\frac{30}{360}$ ths of 24 inches, i.e., 2 inches apart measured on the arc of the circle.

16. The Horizon. Wherever we stand on the surface of the earth there is all around us a vast circle where earth and sky seem to meet. That circle is called the *Horizon*. We can seldom see the horizon on land because hills or trees hide it, but we see it clearly when we look over the sea. As we look round our horizon we face successively in all directions. In order to express *direction* we need

to have certain fixed points in our horizon from which all other directions may be taken. These are what we call the **Points of the Compass**:—**North, South, East, and West**. How they are determined we shall see presently. These cardinal points divide the horizon into four equal parts, and therefore two straight lines drawn from north to south and from east to west would cut one another at right angles, and the observer would always be at the point where these lines cross. The cardinal



Fig. 5. Points of the Compass

points are thus points of a circle of which the observer, or the point of comparison, is at the centre, and minor variations in direction may therefore be expressed with great accuracy in degrees. Thus we may say that a place is north by 10° west of us. Another and more familiar, though less accurate, way of expressing direction is by simply combining the names of the cardinal points, thus "north-east" is midway between north and east; "north-north-east," is midway between north and north-east, and so on.

17. Zenith, Nadir. That point in the heavens which is right over our heads is the *Zenith* of the part of the earth at which we stand. The opposite of the zenith is the *Nadir*—the point in the heavens directly under our feet. The zenith at the antipodes is our nadir, and our zenith is their nadir.

18. Rotation of the earth. The earth rotates, or spins like a top, round an imaginary line drawn through its centre. This line is called its *Axis*. Now every spinning body, whether large or small, tends to maintain the direction of its axis unchanged. This may be seen in an ordinary top, which, when spinning rapidly keeps its axis erect. It may be moved about from place to place, but its axis continues to point in the same direction, and if it is momentarily deflected by a touch it soon recovers itself. This tendency of a rotating body is called

polarity, and the two ends of every such axis are its *poles*. The ends of the earth's axis are the **North Pole** and the **South Pole** respectively. The north pole always points to a particular fixed star which is therefore called the Pole Star. The **Equator** is an imaginary line drawn round the earth midway between the north and south poles. The plane of the equator passes through the centre of the earth, and the axis cuts it at right angles

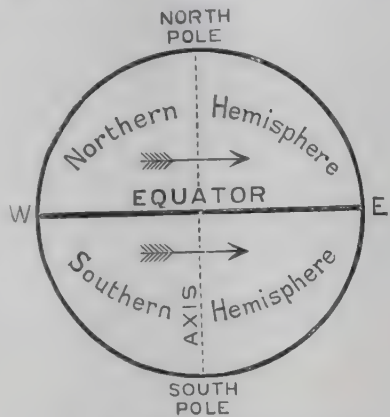


Fig. 6. The arrows show the direction of the earth's rotation.

19. When we look towards the north pole the west is on our left, and the east on our right. The earth rotates from west to east, and therefore the sun and stars first become visible in the east, pass more or less overhead, and sink below the horizon in the west. We speak of the sun and stars *rising* and *setting*, though it is not they that move but the earth itself. If we could stand at either of the poles the stars would appear to go round and round in the heavens maintaining always the same height, and never dipping below the horizon. When we stand on the equator the stars that rise due east pass right over our head and sink below the horizon due west, and the pole star is on the horizon in the north. As we travel from the equator to the north pole the pole star rises in the heavens and is always as many degrees above the horizon as the observer is north of the equator.

20. The earth makes one complete rotation in 24 hours. This gives us day and night. The sun is always shining upon one-half of the earth and not upon the other half. Every moment some part of the earth's surface is passing into the sun's rays, and the opposite part is passing out of them.



Fig. 7. Showing the sun's rays illuminating one side of the earth.

21. Revolution of the earth. The earth travels round the sun making one complete revolution in $365\frac{1}{4}$ days. This gives us our year. The path which the earth takes is its orbit (*L. orbis*, a circle). It is an ellipse, or oval, but is so nearly circular as to be, when accurately drawn on paper, indistinguishable from a circle by the unaided eye. In Fig. 8 the ellipticity of the orbit is greatly exaggerated owing to the angle at which it is supposed to be viewed. The orbit forms a vast plane which passes through the centre both of the earth and of the sun. The distance of the earth from the sun varies. At one part of its orbit (which it reaches in June) it is $94\frac{1}{2}$ millions miles away, and six months later it is $91\frac{1}{2}$ million miles away.

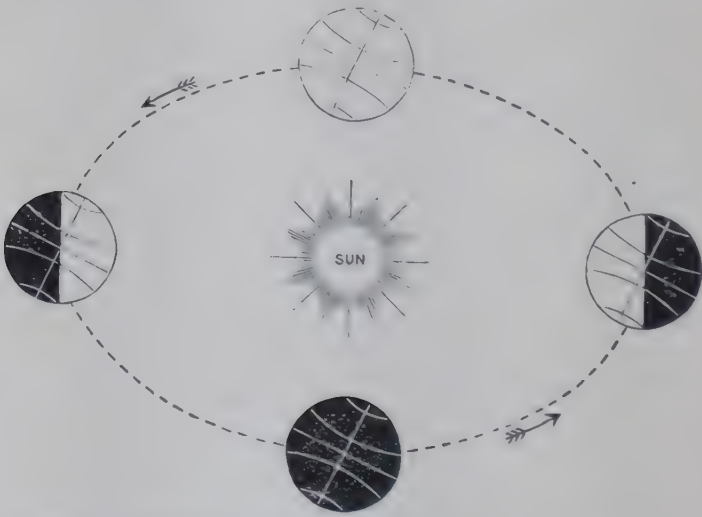


Fig. 8. Showing the earth at different parts of its orbit.

22. Inclination of the earth's axis. The axis of the earth does not cut the plane of revolution at right angles, but obliquely; therefore at one part of its revolution the north pole is inclined towards the sun, and at another the south pole. This gives us our seasons—**Spring, Summer, Autumn, and Winter**—and causes the length of day and night to vary in different places.

23. Everyone is familiar with the fact that at different parts of the year the sun mounts to different heights in the heavens. To one who lives at some distance north or south of the equator still more familiar observations are that the sun rises and sets in different directions in winter and summer, and that the

relative length of day and night varies. The further from the equator the observer is, the greater these differences are seen to be. The observed path of the sun across the sky at different seasons at a place 50° north of the equator is shown in the following diagram. The shaded surface is the plane of the horizon, and the point of observation is, therefore, where the north to south line cuts that from east to west. At mid-

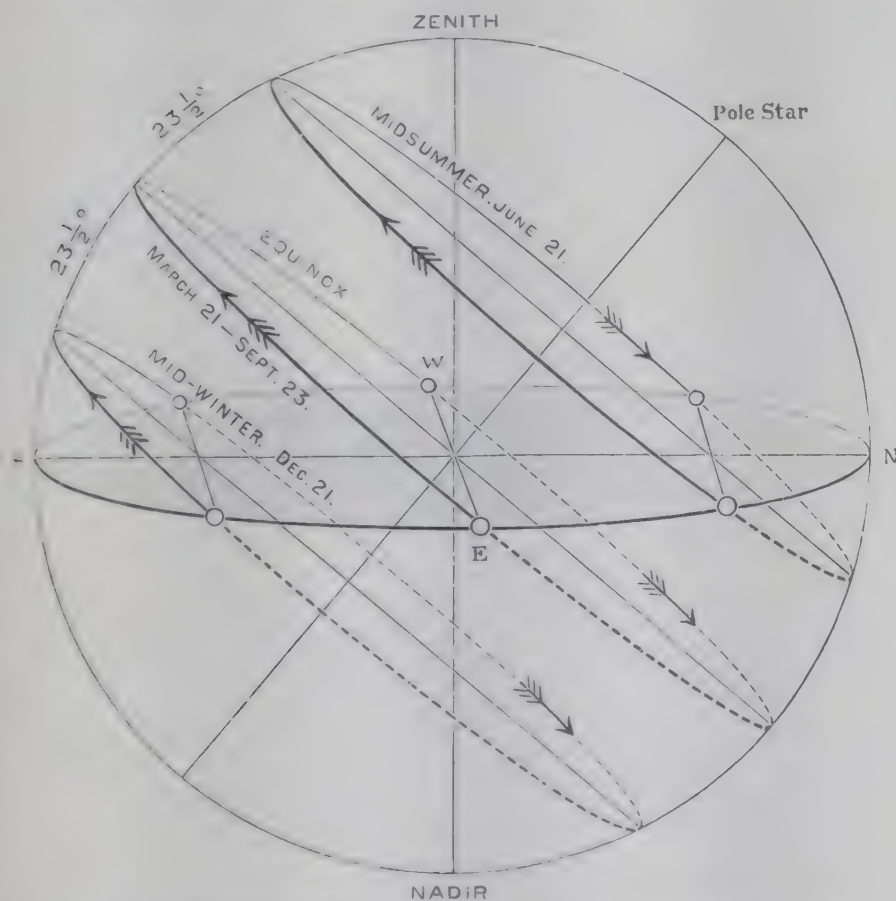


Fig. 9 Showing the path of the Sun in the heavens at any place 50° N. of the equator.

summer the sun is seen to rise far to the north of east, and to set equally far to the north of west, while at midwinter it rises and sets the same distance to the south of east and west. At noon it is always due south, but at midsummer it is nearly four times as high in the heavens as at mid-winter. At midsummer, also, it is above the horizon for two thirds of the 24 hours, but in mid-winter for only one-third.

24. If the earth's axis were at right angles to the plane of its orbit (as shown in Fig. 10), there could be no variation of seasons. The sun would then always rise due east and set due west, and at the equator would pass right overhead every day. Day and night would be equal all over the earth and at all times of the year, and at mid-day the sun would always be exactly the same height in the heavens. At the equator it would reach the zenith and at the poles it would only just be seen on the horizon. The further any place was north or south of the equator the lower in the heavens would the sun be at noon. But it would be *the same height every noon*

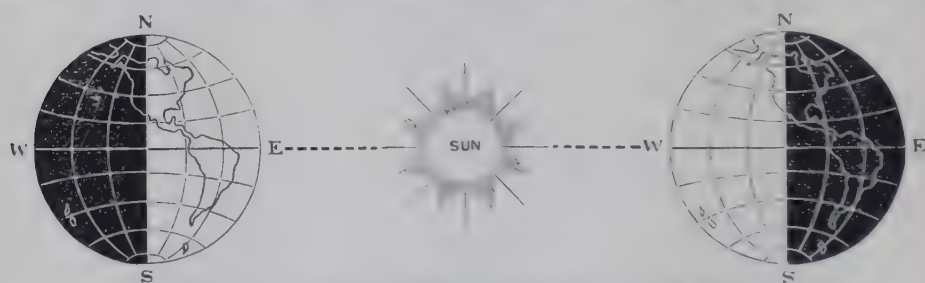


Fig. 10. How the Earth is NOT turned to the Sun.

throughout the year. Now the change of our seasons is caused by the sun shining longer and from a higher point in the heavens on the northern hemisphere for one-half of the year, and on the southern hemisphere for the other half of the year; and this is due to the fact that the earth's axis makes an angle of $66\frac{1}{2}^{\circ}$ with the plane of revolution, and maintains that angle at all times. It follows that in each complete revolution there is a time when the north pole is inclined towards the sun, and a time when the south pole is so inclined. The maximum of inclination in each case is $23\frac{1}{2}^{\circ}$.

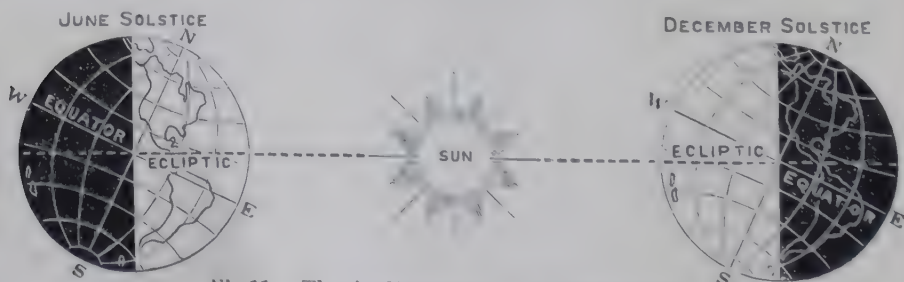


Fig 11. The *inclination* of the Earth's axis.

25. The two positions in which the earth is shown in Fig. 11 are the points of maximum inclination, and the earth reaches

them about June 22nd and December 22nd—midsummer and mid-winter in the northern hemisphere. At the former date the sun's rays not only reach the north pole, but shine for $23\frac{1}{2}^{\circ}$ beyond it, while they fall short of the south pole by the same distance. About December 22nd the opposite is the case; the sun's rays then reaching $23\frac{1}{2}^{\circ}$ beyond the south pole, and falling $23\frac{1}{2}^{\circ}$ short of the north pole. On the first of these dates the sun is directly overhead at noon at all points $23\frac{1}{2}^{\circ}$ north of the equator, and on the second at all points $23\frac{1}{2}^{\circ}$ south of the equator.

26. The Ecliptic. As the earth seems to those upon it to remain stationary and the sun to travel round it, the sun appears to describe a vast circle in the heavens. This circle is called the Ecliptic, because it is only in the plane of the ecliptic that eclipses can occur. The plane of the ecliptic is therefore the same as the plane of the earth's orbit, and as it is inclined to the plane of the equator at an angle of $23\frac{1}{2}^{\circ}$ and passes through the centre of the earth the ecliptic cuts the equator at two points. The ecliptic is marked on a school globe by a great circle running from $23\frac{1}{2}^{\circ}$ S. to $23\frac{1}{2}^{\circ}$ N.

27. The Solstices and Equinoxes. When the sun is at the most southerly point of the ecliptic (about December 22nd), and again when it is at its most northerly point (about June 22nd), it appears to pause for a day or two before turning north or south. These points of the ecliptic are therefore called the *Solstices* (L. *Sol*, and *sto*, I stand). Halfway between the winter and summer solstices, and again halfway between the summer and winter, the ecliptic cuts the equator. The sun reaches these points about March 22nd and September 22nd respectively, and as its rays are then vertical on the equator, and reach both the north and south poles, day and night are equal all over the earth. These points are therefore called the *Equinoxes* (L. *equus*, equal, and *nox*, night), the *Vernal Equinox*, and *Autumnal Equinox* respectively.

28. Day and Night. At the equator day and night are always equal, elsewhere they vary. When the sun is north of the equator the days are longer than the nights in the northern hemisphere, and when it is south of the equator they are longer in the southern hemisphere. In the northern hemisphere the days lengthen as the sun passes north, and in the southern hemisphere as the sun passes south. Moreover,

when the sun is north of the equator the further north any place is the longer are its days, and when it is south of the equator, the further south any place is the longer are its days. At each of the poles there is six months continuous daylight and six months continuous night.

29. The Arctic Circles and the Tropics. It will be observed that when the sun is at its furthest point south (i.e., at the December solstice), its rays do not reach the north pole: they fail to reach it by exactly the same number of degrees as the sun at that moment is south of the equator, viz., $23\frac{1}{2}^{\circ}$.

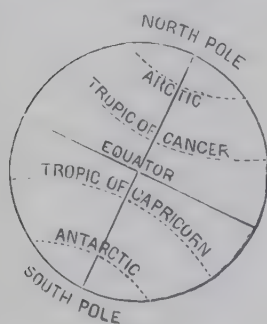


Fig. 12.

There is thus a circle round the north pole within which the sun is invisible on December 22nd. This is the **Arctic Circle**. There is a precisely similar circle of darkness round the south pole on June 22nd, when the sun is at the most northerly point of the ecliptic. This is called the **Antarctic Circle**. These circles are in each case $23\frac{1}{2}^{\circ}$ from the poles and $66\frac{1}{2}^{\circ}$ north or south of the equator. Similar circles drawn round the earth $23\frac{1}{2}^{\circ}$ north or

south of the equator, mark the most northerly and most southerly points of the ecliptic. They are called *Tropics* (Gr. *tropos*, a turning), because when the sun gets to these points it appears to turn. The northern tropic is called the **Tropic of Cancer**, and the southern the **Tropic of Capricorn**.

30. The Zones. These natural circles divide the earth's surface into *Zones* of temperature (Gr., *zônē*, a belt). It is

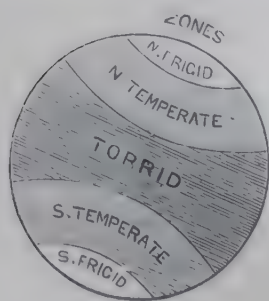


Fig. 13.

a matter of common observation that the sun's rays have the greatest heating power when they are vertical, and the least when they strike the earth most obliquely. At every place within the tropics the sun is right overhead twice in the year. This is, therefore, the hottest part of the earth and is called the **Torrid Zone** (L., *torridus*, hot). Within the Arctic and Antarctic circles the sun is never very high in the heavens, and

those regions are, therefore, always cold. These two zones are called the **North Frigid Zone** and the **South Frigid Zone**.

respectively (*L. frigidus*, cold). Between the Arctic Circle and the Tropic of Cancer lies the **North Temperate Zone**, and between the Antarctic Circle and the Tropic of Capricorn lies the **South Temperate Zone**.

31. It must not be supposed that at the circles which separate one zone from another there is any sudden change of temperature. The southern portion of the North Temperate Zone is very little different from the northern portion of the Torrid Zone. A traveller from the equator to the arctic regions would pass from heat to cold by almost imperceptible gradations.

32. Nor must it be supposed that the belt of greatest summer heat is at the equator. It is true that taking the average of the whole year the sun is higher in the heavens at the equator than at any place north or south of it. At the equator, however, day and night are always equal. But at the summer solstice, when the sun is on the Tropic of Cancer, the day is longer than the night in the northern hemisphere. At the tropic itself the sun is above the horizon for about 14 hours, and at noon it is at the zenith. It follows, therefore, that for a week or two near the summer solstice the belt of the earth lying immediately north or south of the Tropic of Cancer receives a greater amount of heat from the sun than is ever received in a period of equal length at the equator. At the winter solstice (when it is summer in the southern hemisphere) the same is true of a similar belt north and south of the Tropic of Capricorn.

33. **Latitude and Longitude.** The part of the earth known to the ancients was much greater from east to west than from north to south. They travelled from North India to the Pillars of Hercules (Gibraltar), but penetrated only a short distance north or south. They therefore called distance from east to west *longitudo*, or length, and from north to south *latitudo*, or breadth. **Latitude** is distance measured in degrees (angular distance) north or south of the equator, and may be anything up to 90° N. or S. The **Parallels of Latitude** are imaginary lines drawn round the earth parallel to the equator

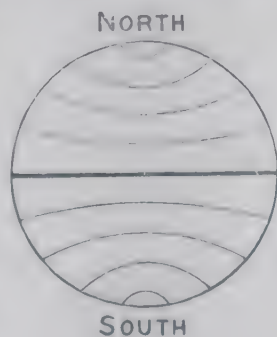


Fig. 14.
Parallels of Latitude

Imaginary lines are also drawn round the earth running north and south and passing through both poles. These are called **Meridians** (L. *meridies*, mid-day), because places on the same meridian have mid-day at the same moment. The meridians cut the equator and all the parallels of latitude at right angles. **Longitude** is angular distance east or west of a given meridian,

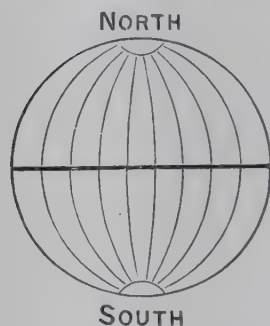


Fig. 15. The Meridians.

and may be anything up to 180° where (as that is half round the circle of the earth) east longitude and west longitude meet. The English reckon longitude from the meridian of Greenwich, and this system is now adopted by all other nations except the French, who use the meridian of Paris. When we know the latitude and longitude of any place we know its exact position upon the earth's surface.

34. The circumference of the earth at the equator we have seen to be 24,899 miles. A degree at the equator is, therefore, slightly over 69 miles. But as we approach the poles the circles made by the parallels of latitude grow ever smaller. Therefore the further north or south we go the smaller become the degrees of longitude when measured in miles. In Appendix II. the length of a degree of longitude at different latitudes is given.

35. **Time** is measured by the sun. When the sun reaches its highest point in the heavens at any place, it is on the meridian of that place, and it is noon there. As the earth rotates from west to east, those places which have east longitude reach their noon before Greenwich, and those that have west longitude after Greenwich. As the earth turns on its axis once in 24 hours it passes through 15 degrees every hour, or a degree in 4 minutes. The difference in the time of two places is, therefore, four minutes for every degree of difference in their longitude. If the longitude of a place be known the difference between its time and Greenwich time can thus easily be calculated; and if the difference in time be known the longitude can be calculated. The longitude of Delhi is $70^\circ 16'$ E., and therefore we know that its time is $75\frac{16}{15}$ = 5 hrs. 9 mins. ahead of Greenwich. New York time is 4 hrs. 50 mins. behind Greenwich, and therefore its longitude is $4\frac{50}{60}$ of 15° W. = 74° W.

THE MOON

36. Revolution and Rotation. The moon goes round the earth very much as the earth goes round the sun. The diameter of the moon is 2,160 miles, and its mean distance from the earth is about 238,000 miles. It performs its revolution round the earth in a little more than $27\frac{1}{4}$ days. The moon also rotates upon its axis, and as the periods of rotation and revolution are exactly the same, one side of the moon is always turned towards the earth and the other is never seen. The moon is not, like the sun, a *source* of light, but only reflects the light which it receives from the sun.

37. The moon revolves round the earth from west to east, which is the direction of the earth's rotation. While the earth turns once on its axis the moon moves through about $\frac{1}{27}$ th of its orbit. If the moon revolved from east to west it would rise earlier every day; as, however, it revolves round the earth in the direction of the earth's rotation it rises later every day by about $\frac{1}{27}$ th of 24 hours. From moon-rise to moon-rise is called a lunar day, and the mean lunar day is 24 hours, 54 minutes.

38. Eclipses. An eclipse of the Sun is caused by the moon coming between the earth and the sun, and obstructing the sun's rays.



Fig. 16. Illustrating an Eclipse of the Sun.

The sun may thus be entirely hidden, and the eclipse is then *total*, or only partly so, when the eclipse is *partial*. In Fig. 16 the eclipse is total where the dark shadow falls upon the earth, for there no part of the sun would be visible, but **only partial where the lighter shadow falls.**

39. An eclipse of the moon is caused by the moon passing through the shadow cast by the earth. See Fig. 17.

40. Eclipses can only occur at New or Full Moon, for only then are the sun, earth, and moon in line. If the plane of the moon's orbit coincided with the plane of the earth's orbit (i.e. with the ecliptic), there would always be an eclipse of the sun

at New Moon, and an eclipse of the moon at Full Moon. But the orbit of the moon inclines to the ecliptic at an angle of about 5° . The moon passes through the plane of the ecliptic twice in every revolution, but it is only when that occurs at such a point as brings it into line with the sun and the earth that an eclipse can take place.

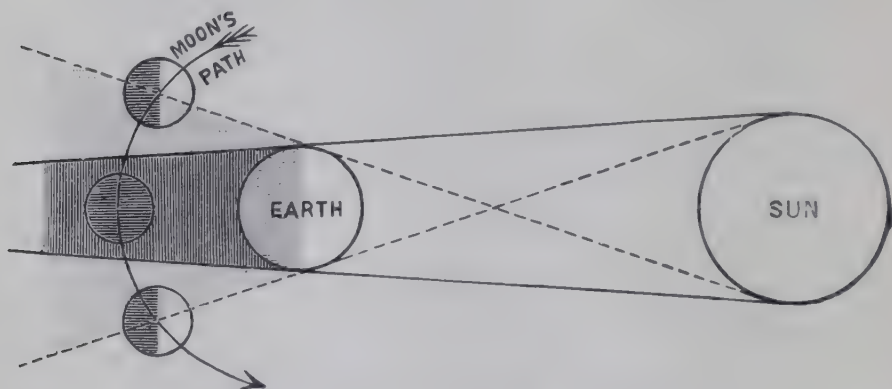


Fig. 17. Illustrating an Eclipse of the Moon.

41. The Tides. The waters of the ocean rise and fall twice in every lunar day. These are the *Tides*. They are caused by the attraction of the sun and moon—chiefly the latter.

42. In order to understand the tides we need to bear in mind the great law of *Universal Gravitation*, which is commonly stated thus: "Every particle of matter attracts every other particle with a force which is directly proportionate to the product of their masses and inversely to the square of their distance." It is this great principle of universal gravitation which keeps everything on the surface of the earth from flying off into space, and which holds all the heavenly bodies in their orbits.

43. The sun, because of its vast mass (more than 25 million times that of the moon), exercises a far greater attraction upon the earth than the moon does, but the moon's attraction is, nevertheless, the chief cause of the tides. The sun does cause a tide, but a much smaller one than the moon. The reason of this is that the tide is caused by the difference in the degree of attraction exercised by the sun or moon upon the side of the earth facing it and upon the centre of the earth. Now the sun is so far away that it exercises almost the same amount

of attraction at every part of the terrestrial sphere. The radius of the earth is about 4,000 miles, which is an almost inappreciable distance compared with the vast distance of the sun, being only as 1 to 23,250. But compared to the moon's distance it is as 1 to 60. The moon therefore exercises a decidedly more powerful attraction upon the side of the earth facing it than upon the centre, and as the waters flow freely on the surface it draws them into a heap towards itself. At the same time it pulls the solid earth away from the waters on the other side of it, which are still further away. The sun



Fig. 18. To illustrate Spring Tides.



Fig. 19. To illustrate Neap Tides.

acts in precisely the same way, but to a much less degree. When, therefore, the sun and moon pull in the same line, that is at New Moon and Full Moon, the tides are very high, and when they pull at right angles, the tides are low. The former are called Spring Tides, the latter Neap Tides.

44. Now if the earth were at rest as regards the moon, and therefore always turned the same side to it, this heaping of the water would always be in the same two places, and would never be noticed. The heap would only be from ten to twelve feet high, and far greater modifications of the level of the sea are caused by the influence of mountain ranges. The attraction

of the Himālayas and the vast plateau of Tibet is known to raise the waters of the Arabian Sea by 300 feet, and the great chain of the Andes is believed to raise the level of the Pacific on the west of South America to a still greater degree. But owing to the earth's rotation the tidal waves tend to travel round the earth. Or, to put it differently, the earth rotates *within the constant tidal wave*. If the surface of the earth were all water the tidal wave would travel round it very nearly from east to west, but it is forced out of its true course by the configuration of the land, and actually flows almost in a northerly direction. As tidal waves are raised on both sides of the earth there are two tides in every lunar day; and a lunar day, as we have seen, is 24 hours 54 minutes long.

45. Where the free flow of the wave is obstructed by the land, the waters are piled up, often to a great height. In the Bay of Fundy, between Nova Scotia and the American coast, the tides rise 70 feet. In inland seas like the Mediterranean and the Baltic, the tides are very slight. Such seas cannot share in the tides of the ocean, and their own tides are trifling. Sometimes the tidal wave, meeting the waters of a swift river, is piled up like a wall, and rushes up the river at a great speed and with a loud roar. Such a rush is called a *bore*. The tides are of great importance. They often make rivers navigable that would not otherwise be so, by scouring out the river-bed and carrying away the silt that might block the channel.

MAPS

46. **Maps** are plans on paper showing the surface of the land or sea. It is easy to understand how a small area which is practically flat can thus be quite accurately represented. The plan of a town, for example, can easily be drawn from measurements so as to give a true and correct representation of every part of it. But when we come to larger areas such as a continent, a great difficulty is encountered in the curvature of the earth's surface. This difficulty will be appreciated by anyone who tries to make a sheet of paper lie evenly on the surface of a round ball. Unless we understand the methods by which those who draw maps overcome this difficulty, maps themselves will often be misleading to us.

47. No one can look carefully at a map of the earth in two hemispheres without noticing that all round the edge of the hemispheres the outlines of countries are considerably distorted. If we compare the shape of Europe as it appears in the map of the Eastern Hemisphere with its shape in its own map or on a globe, we shall see that the two do not agree at all. In the map of the hemisphere the length of the continent from Spain to the north-east of Russia seems to be too great when compared with its breadth from Norway to Greece. In order to make proper allowance for such distortions of outline we must have some knowledge of what geographers call the **Projection** of the map. Projection means *throwing forward*, and is the term used to signify the way in which a spherical surface is thrown on to a flat sheet.

48. The best idea of a projection can be got by imagining half a globe to be made of glass, and the continents, etc., to be drawn upon it in transparent colours. If this hemisphere be held in the sun's rays what is painted on the glass globe will

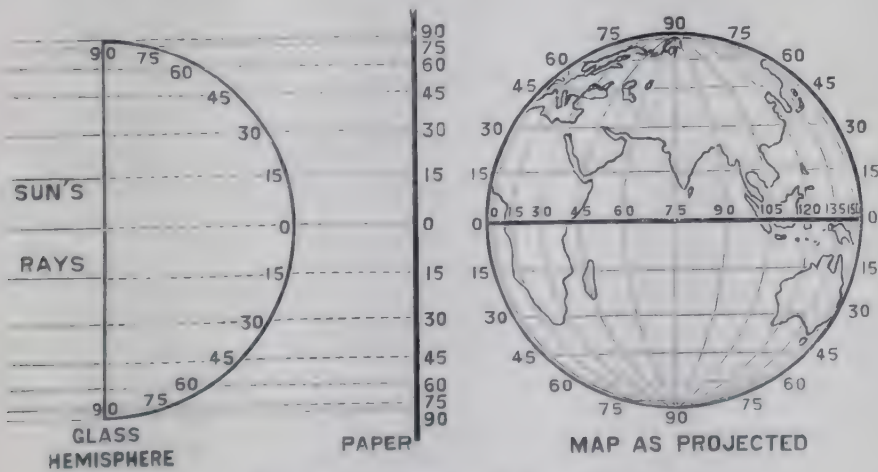


Fig. 20. Orthographic Projection.

be thrown on to a sheet of paper placed behind it. But consider what the effect will be. The distance of an inch at the centre of the hemisphere will appear as an inch on the paper, but an inch on any other part of it will be reduced on the paper, and will be the more reduced the nearer it is to the edge. Fig. 20 will explain this. The straight line divided by dotted lines from the hemisphere shows what would be the distance on the paper between parallels of latitude which are equidistant

on the globe. This is called the **Orthographic Projection**, and the second part of the figure shows what a map of the Eastern Hemisphere would be like if drawn on this projection.

49. Let us now suppose that instead of the picture being cast upon the paper by the sun's rays, which are practically parallel, a bright lamp is placed on the equator at the opposite side of the globe (A in the figure below). It will be seen that

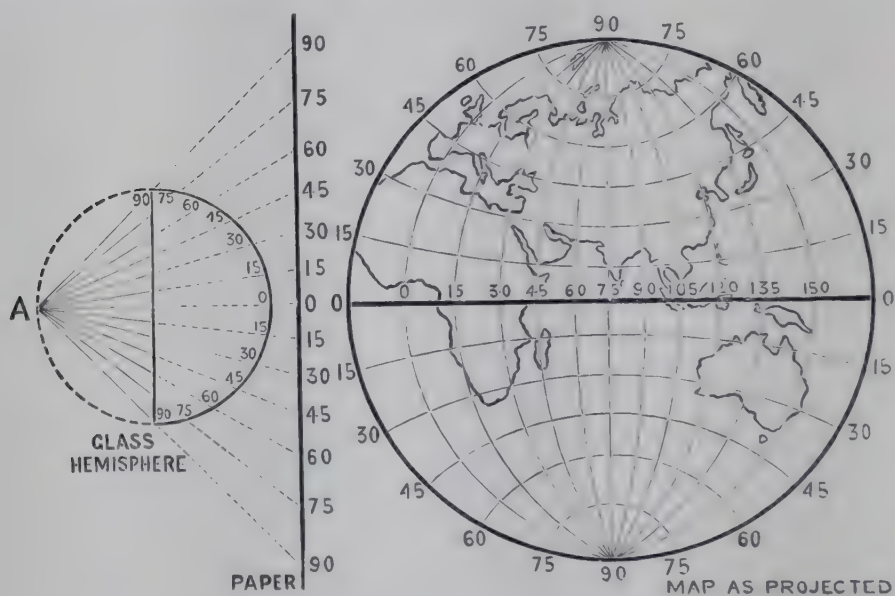


Fig. 21. Stereographic Projection.

the map now cast upon the paper is much magnified, and that instead of the portions near the outside of the hemisphere being reduced they are considerably enlarged. This is called the **Stereographic Projection**. As the basis of a map of the hemispheres this projection would be as unsatisfactory as the orthographic, for the central part of the map would be on a much smaller scale than the outside portion.

50. A projection that is mid-way between these two is, therefore, generally adopted by Geographers. If the lamp be moved a little further away from the hemisphere to C, it will be found that provided the length of AC is half that of AB equal distances on the hemisphere are represented by almost equal distances on the paper. This is known as the **Globular Projection**, and is the one usually employed in maps of the hemispheres. Even in this projection it will be seen

that there is a considerable amount of distortion in the outer portions of the map. Nevertheless the globular projection

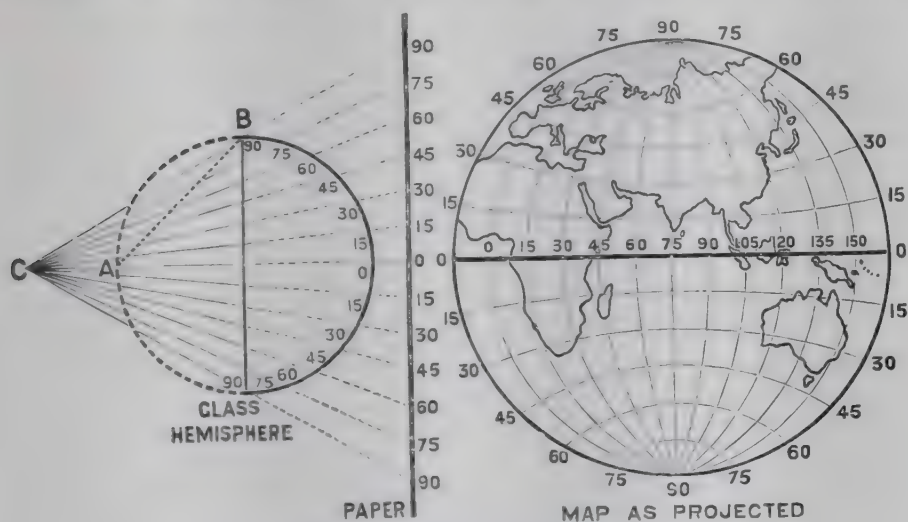


Fig. 22. Globular Projection.

is the most accurate way in which the curved surface of a hemisphere can be represented on a flat sheet.

51. In maps which represent only a section of the earth's surface, say a country like India, the projection that is commonly used is what is called the **Modified Conic Projection**. The paper is supposed to form a cone and be so placed over the globe that the apex of the cone shall be directly above one of the poles. The paper would then touch the globe all round on the same parallel of latitude. The meridians would be cast upon such a cone as straight lines converging at the apex, and the parallels of latitude as parallel circles at right angles to the meridians. In this projection (the **Pure Conic**) there would be too much

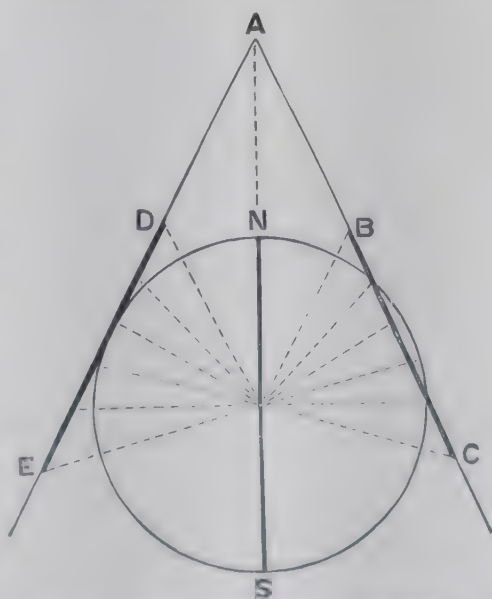


Fig. 23. Conic Projection. The line DE illustrates *pure* conic projection, and the line BC *modified* projection.

contraction towards the apex of the cone and too much expansion towards its base, and to remedy this the paper is supposed to cut the globe, entering it about half way between the centre of the map required and its northern limit, and emerging half way between the centre and the southern limit. This reduces the distortion to a minimum.

52. Another projection also used (and seen in the coloured map at the beginning of this volume) is that known as

Mercator's. It is a modification of what is called the **Cylindrical Projection.** Imagine the sheet of paper, instead of being flat upon the wall, or folded as a cone, to be folded round the glass globe as a cylinder, and the lamp to be at the centre of the globe. All the meridians will be cast upon the paper as perpendicular lines and the parallels of latitude as horizontal ones. The parallels of latitude will also be further and further apart as they are further north or south. If the cylinder be then opened out and spread upon the table we shall have a map projected in such a way that horizontal lines

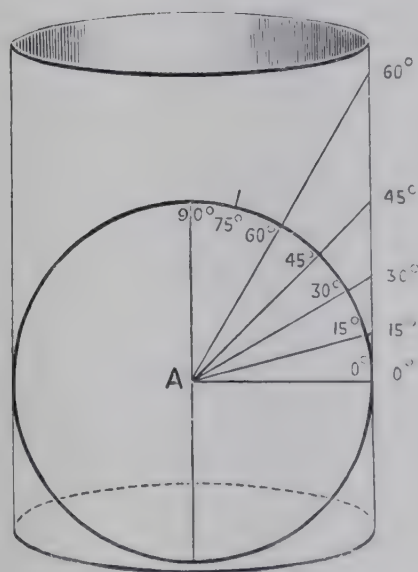


Fig. 24. Cylindrical Projection, of which Mercator's is a modification.

drawn upon it always run due east and west, which is true only of the equator in the globular projection. In the same way vertical lines will always run due north and south, which is true only of the central meridian in the globular projection. But since degrees of longitude grow less and less in proportion as they are nearer the poles, and yet are shown upon the map as equal to degrees upon the equator, it is plain that distances from east to west are magnified as we pass from the equator to the poles. And as the parallels of latitude are thrown further apart the farther they are from the equator, distances north and south are greatly magnified also. If the map at the beginning of this volume be examined it will be seen that the distance between the parallels of 60° and 80° is much greater than that between the equator and either parallel of 20° .

The result of this projection, therefore, is that there is a great increase of size as we go north or south from the equator, and places in the extreme north and south look enormously larger than they really are.

53. Mercator's modification of the cylindrical projection consisted in making the proportionate enlargement from east to west and north to south equal at each point, so that the shape of each country should be more truly represented. This increases the enlargement near the poles but preserves the accuracy of outline. Mercator's projection is the one invariably used for *Charts* for mariners. It is of little moment to the sailor whether the relative size of seas and countries is accurately shown on the charts he uses; and as for mere distance he can easily calculate that. What he needs above everything is a map in which *direction* is always true; on any part of which he can lay a transparent compass circle. Mercator's projection *alone* meets this need.

54. It must not be supposed that in the practical drawing of a map anything of the nature of a glass globe is used, or that the paper is actually folded as a cone or cylinder. What we have described is not the process of map-drawing, but the various theories of projection on which curved surfaces are more or less accurately represented on a flat sheet. No method enables us to do this with absolute accuracy. Towards the edges of every map, no matter on what projection it is drawn, there is some measure of distortion in shape or size, or both. But, by the use of the globular projection for maps of large area (e.g., a continent), and the modified conic projection for those of smaller area, the distortion may be rendered so slight as to be of no practical moment.

55. Map Drawing. In the drawing of sectional maps not extending beyond 10° N. or S. of the equator, the lines of longitude and latitude may be drawn as two series of parallel lines, the one series being at right angles to the other. The length of 1° of longitude at the equator is 69.16 miles, and at 10° N. or S. 67.96 miles. So that if the middle line of any such map be made accurate according to the scale adopted, the proportionate enlargement or reduction, north or south, cannot be more than $\frac{1}{115}$ th, a fraction that is practically negligible on ordinary maps. If, however, the map be of a country further from the equator (where the diminution in the length

of the degree of longitude is more rapid) the modified conic projection should be used. We shall now indicate how this method is applied in actual map-drawing.

56. Suppose we have to draw a map of the Indian Empire. The first thing that we must decide is the *scale* upon which we can work, and that depends upon the size we wish our completed map to be. Let us assume that we have to draw it on a sheet of paper 12 inches deep by 15 inches wide. Now as the Indian Empire extends (from the west of Balūchistān to the eastern corner of the Shan States) through about 40° of longitude, or nearly 2,400 miles, it is manifest that the largest scale we can adopt is one of 200 miles to an inch. We adopt this scale, therefore, and further decide to draw our meridians and parallels at distances of 5° apart.

57. We are now ready to begin. We first draw, in light, clear pencil, a straight line (A-B) down the middle of our paper. This will be our central meridian. As the map will extend in the north from 60° E. to 100° E. this central meridian is plainly 80° E. From south to north the map must extend from $7\frac{1}{2}^\circ$ to $37\frac{1}{2}^\circ$ N. latitude, and therefore the cone ought, theoretically, to cut the sphere at the parallels of 15° and 30° N. On the line AB we take a point (G) about a quarter of the way up the paper, which we mark 15° , and from that point we measure distances of 5° up and down the line. Now the length of a degree of latitude varies but little. At 15° N. it is almost exactly $68\frac{3}{4}$ miles and it may be taken at that length throughout the map. Five degrees will thus be $343\frac{3}{4}$ miles, and on the scale we have adopted will be represented by $1\frac{2}{3}\frac{3}{4}$ inches. With our compasses we take this length as accurately as we can from a graduated scale, and beginning from 15° mark a series of points at this distance apart up and down our central meridian. We number these points 10° , 20° , 25° , 30° , and 35° . We must now apply our scale to the longitude at each of the parallels at which the cone is supposed to cut the sphere, i.e., at 15° and 30° . At 15° the length of a degree of longitude is $66\frac{3}{4}$ miles, and 5° on our scale will therefore be almost exactly $1\frac{2}{3}$ inches. Taking our compasses again we describe a circle from the point G on the central meridian with a radius of $1\frac{2}{3}$ in. At 30° on the central meridian we must describe a similar 5° circle, but, as the length of a degree of longitude at that latitude is only $59\frac{3}{4}$ miles, the

radius of this circle must be $1\frac{7.9}{16.0}$ (or very nearly $1\frac{1}{2}$) inches. It will not be easy to measure these exact lengths, but care should be taken to make them as exact as possible; for upon the precision with which we apply our scale the accuracy of our map will depend. Having described these circles we then draw the straight lines C-D and E-F, each line just touching the circumference of both circles. These will be the meridians 75° and 85° respectively. Now if we have, so far, worked accurately, the three meridians we have now obtained will

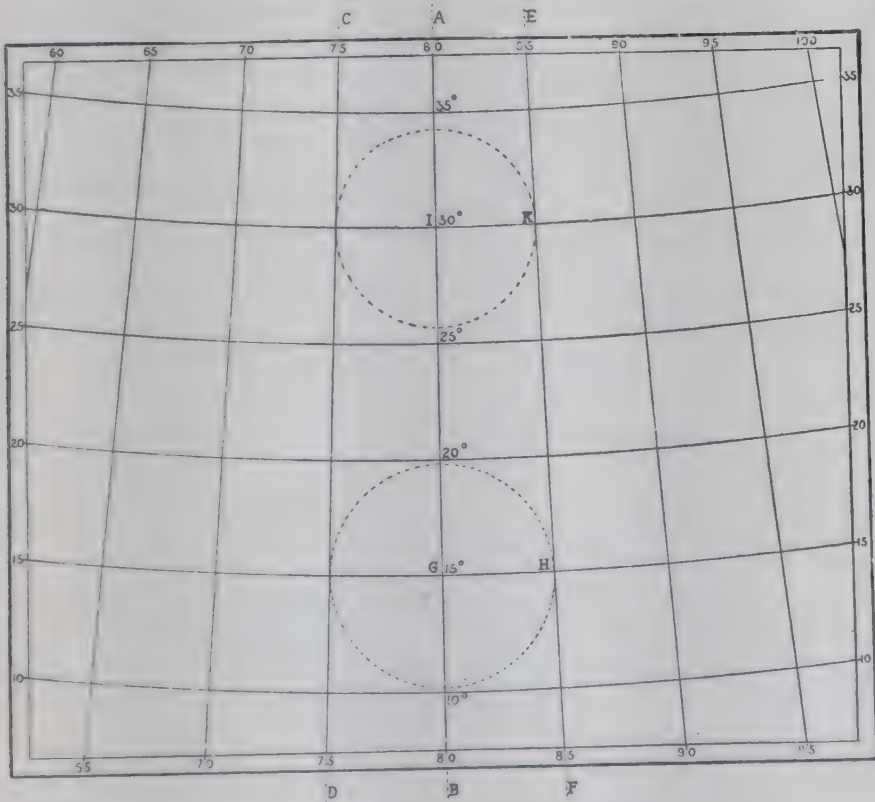


Fig. 25. A modified Conic Projection.

it produced towards the north, meet in *one point*, and that point will indicate the position of the North Pole as regards our map. With the N. Pole as a centre we now describe an arc through each of the six points on our central meridian. These arcs are our parallels of latitude. To complete our meridians we must measure along the parallels 15° and 30° a series of distances equal to G-H and I-K respectively, marking each point carefully. Lines connecting each pair of

these points, and produced north and south, will give us the remainder of our meridians, and each meridian will cut every parallel at right angles.

58. All that is now left to do is to draw our frame, ink in our lines, and remove our working pencil-marks. The bottom of the frame must be $2\frac{1}{2}^\circ$ south of the parallel 10° , and the top the same distance north of that of 35° ; and the sides must be drawn equidistant from the central meridian. When we have drawn the frame we then ink in the meridians and parallels, and number them in the frame. Our projection is now completed, and as soon as we have cleaned away the pencil marks (shown on the diagram by dotted lines) we may proceed to sketch in the outline of our map.

59. The representation of mountains and hills upon a map is of great importance. Two different methods are adopted: (1) a series of what are called **Contour Lines** are drawn, each

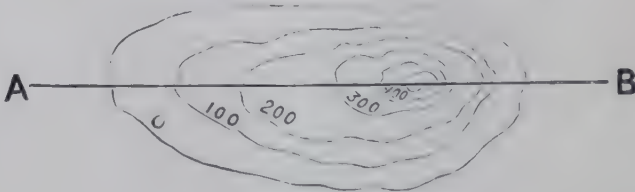


Fig. 26. Contour Lines.



Fig. 27. Vertical Hachuring.

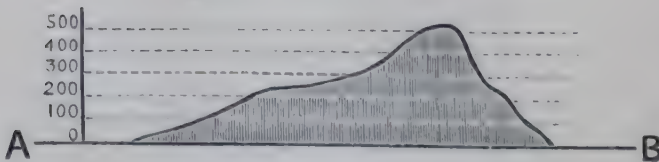


Fig. 28. Section.

line indicating a particular height above sea level, or (2) lines are drawn from the summit of the hill to the valley, always running in the direction in which water would flow, the steep

descents being heavily shaded and the gentler slopes more lightly. Figs. 26, 27 and 28 will make this clear. The first shows it by means of contour lines, the next by the second method, or what is technically called **Vertical Hachuring**, and the last is a section of the hill made at the line AB.

60. Sometimes contour lines are combined with shading in various tones of grey, or colours, and when so treated are undoubtedly the best and clearest way of indicating heights. All delicate physical maps are so drawn now. Fig. 29 is an illustration of this method.

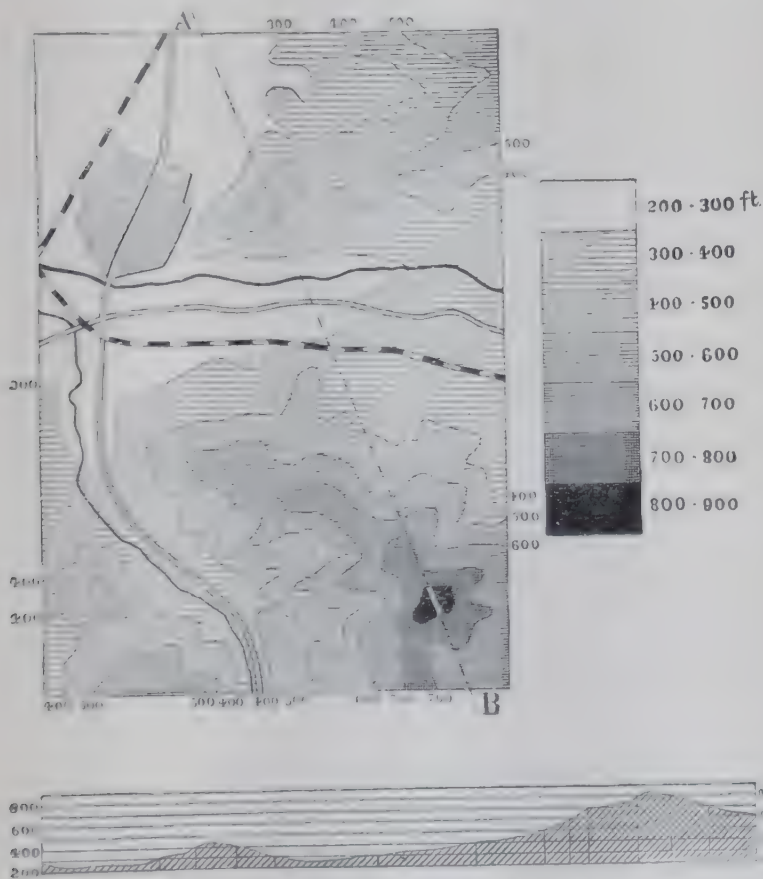


FIG. 29. The upper part of the figure is part of a map with contour lines and an increased depth of shading for every 100 ft. of height.
The lower part is a section along the line AB.

PHYSICAL GEOGRAPHY

61. A general view of the earth's surface shows us, first of all, that it is divided into land and water. We find that the solid ground is not level, but has vast areas of depression into which, under the action of gravity, the water settles, and vast areas of elevation which are above the level of the water and form the dry land. A somewhat closer examination shows us that in one or other of its three familiar forms—*liquid* water, *solid* ice, or *gaseous* vapour—water completely surrounds the earth, being present everywhere in greater or less degree. It thus forms an envelope, or wrapping, of the solid sphere. We further see that land and water alike have over them a vast ocean of air, which settles upon their surface under the action of gravity just as the water settles on the land. This forms a second envelope or wrapping that completely surrounds the earth. Physical Geography is concerned with the various phenomena presented by these three great "spheres"—the solid earth, or *lithosphere* (Gr. *lithos*, a stone), the watery envelope, or *hydrosphere* (Gr. pref. *hydro*, from *hudor*, water) and the gaseous envelope or *atmosphere* (Gr. *atmos*, breath).

62. But in studying them land, water and air cannot be quite separated. The phenomena which they present are to a very large extent mutually dependent. The most cursory observation of the land shows us that its surface is being continually changed by the action both of water and air. These operate in many ways, but some of their influences are easily seen and quite familiar. We notice, for instance, that both air and water are in continual motion, and that by their motion they are unceasingly changing the surface of the land. High winds move vast quantities of dry earth and sand from one place to another, levelling it here, piling it up there. Rain, streams and rivers, and the restless waves of the sea, do a similar work on a far larger scale, steadily wearing down the dry land, moving it to other places, and depositing it at lower levels. All this may be seen on any hillside after heavy rain. On the other hand, again, the movements of both air

and water are largely dependent upon the land itself, upon its distribution and character, and the different effects of the sun's rays upon land and water. The three great "spheres" are thus inseparably associated.

THE SOLID EARTH OR LITHOSPHERE

63. A careful study of the rocks of which the land is built up, their composition and formation, their arrangement, and the remains of animal and vegetable life which they contain, enables us to trace the changes which the earth has undergone through long geological ages. Such a study, however, lies outside the proper scope of Geography, which is mainly concerned with the surface of the earth *as it now is*. Nevertheless, some knowledge of the changes through which the lithosphere has passed, and of the forces which have moulded it, is necessary if we would understand the various land-forms as they appear to-day.

64. There are many reasons for believing that the solid land is only the crust upon a ball of molten matter. It is probable that at one time the earth was so hot that everything was fluid, and that as it cooled a crust of solid rock was formed upon its surface, which is still slowly thickening. When miners dig deep into the ground they find the earth gets hotter the further they go down. If the heat increases as steadily at greater depths as it does near the surface, then at a depth of about 30 miles it must be sufficient to melt every kind of rock or metal that we know. We have proof in the existence and activity of volcanoes that there is a great store of heat within the earth, and that molten rock exists not very far below the surface. In the Hawaiian Islands, in the crater of the volcano Kilauea, there is a lake of glowing molten lava over a mile in diameter, which is called by the natives Halemaumau—"the house of everlasting burning." The volcano is always more or less active, and the level of the lake rises and falls, and sometimes overflows the crater wall, but the seething fiery mass of molten rock never cools or solidifies. Further, mathematicians have shown that the shape of the earth—bulging out at the equator where the motion of rotation is most rapid—is just the shape that would be assumed by a rotating fluid sphere.

65. Now, since a ball of fluid matter rotating on its axis would maintain a fairly uniform surface, it is probable that the thin crust of the earth, when first formed, was without any great protuberances or depressions. But this could not long

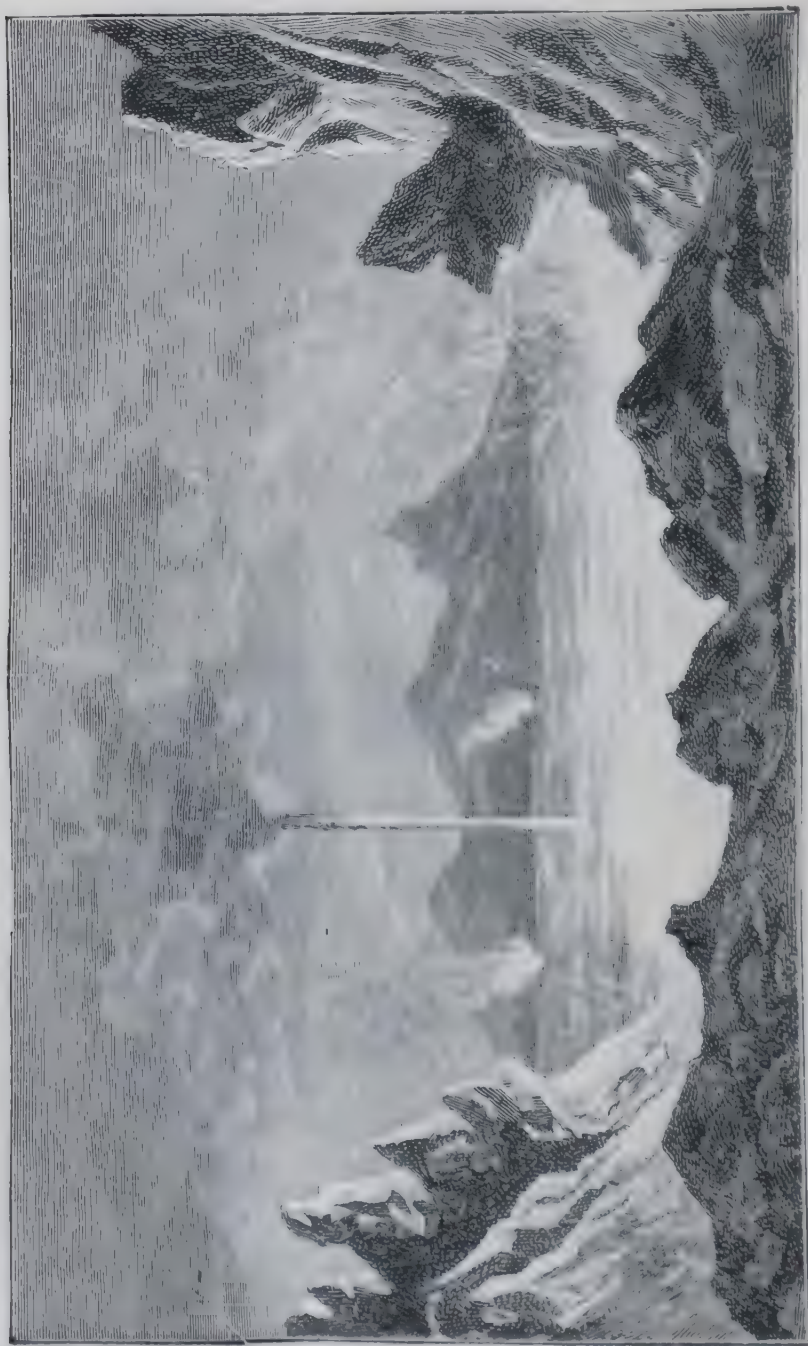


Fig. 30. Halemauau—"The House of Everlasting Burning"—in Hawaii.

continue. Owing to contraction in the process of cooling, large depressions in the crust would be formed, separated by ridges or areas of elevation. This process has often been compared to the crinkling of the skin of a roasted apple while cooling. As this shrinking went on the thin crust of the earth would inevitably be cracked or torn asunder at different points, or along lines of weakness, and through the openings thus made vast outflows of molten matter would occur. In all probability this continued for many ages before the surface became cool enough for the deposition of water upon it. When that time arrived the water, as it gradually condensed, would settle in the great depressions, thus forming the earliest oceans, while the unsubmerged parts of the surface would constitute the earliest continents. The water would then begin its great work of earth-moulding, washing down into its depths the disintegrated particles of the solid land, laying them down upon its bed, and there building them up into new forms.

66. We must not suppose, however, that the oceans and continents as we see them now are just as they were first formed. The present distribution of land and water belongs to a comparatively recent geological period, and is, even now, continually undergoing change. In some places the land is being gradually, though slowly, submerged through settlement. In others the sea-bed is being slowly raised, and the area of dry land increased. Now that the crust of the earth is thicker and more rigid these great earth-movements are doubtless much slower than in earlier ages, but that they still go on, and are perpetually changing the contour of the land, is certain. On the southern shore of Crete there are docks built by the early Greeks which are now high out of the water. On the other hand many places which only a few hundreds of years ago were abodes of men are now deep below the surface of the sea. This is especially the case in north-western Europe. There is little doubt that at one time the sea which now separates Great Britain from Holland and Belgium did not exist, and England was joined to the continent of Europe. In more distant ages we have traces of far vaster earth movements. The western Hymālayas and the Plateau of Tibet were once below the level of the sea. It is almost certain also that in remote ages peninsular India was united with South Africa by a vast stretch of continental land of which all that now remains above

sea-level is Madagascar and a few smaller islands, most of the rest now lying a thousand fathoms deep. Whether the deepest parts of the present oceans were ever dry land it is impossible for us to say, most likely they have always been sea. But we know that the oceans have greatly changed in shape and size, and we have indisputable evidence that the greater part of the dry land as we now know it was once sea-bed. The proof of this is found in the rocks themselves.

67. The rocks of which the crust of the earth is composed are mainly of two kinds. (1) **Igneous**, or **unstratified** rocks, which have been formed directly by the cooling and solidification of the molten matter of the earth, sometimes on the surface, and sometimes at great depths and under great pressure. (2) **Aqueous** or **stratified** rocks, which have been formed by the agency of water, and are composed of the disintegrated particles of older rocks deposited in layers, or strata, on the ocean bed and consolidated by pressure. Igneous rocks are of all ages, from the most ancient rocks of the primeval crust down to the most recently solidified masses of volcanic lava. The oldest igneous rock (of which the best-known type is **granite**) is highly crystalline in structure, and exceedingly hard. It is the most ancient formation known to geology and is therefore called **Archæan** rock. Aqueous rocks are all of more recent origin; but the large number of strata that lie one upon another, their thickness, and the slowness with which each layer must necessarily have been formed, prove the oldest of them to be of immense antiquity. Their absolute age we can do little more than guess, but the relative ages of the different strata are shown partly by the order in which the strata are superposed one upon the other, but chiefly by the fossil traces of life which they contain.

68. Now the greater part of the land, as we know it, is built up of aqueous rocks, and therefore formed for long ages the bed of the sea. It was then either slowly thrust upwards by the operation of internal forces, or else, owing to the settlement of the deeper parts of the ocean bed, the general level of the water was reduced and the more elevated parts of the bed exposed. The latter would appear to have been the case wherever the strata are now found in their original horizontal position, unbroken and unbent. This is however, comparatively rare. As a rule the strata are bent, and often broken, and have

plainly either been elevated by gigantic upheavals from below, or forced upward in sharper curves by the folding of the crust through lateral pressure.

69. Many parts of the earth show signs of successive periods of submergence. Such is the case with the mountainous region to the north-west of India, the structure of which yields conclusive proof that ages before their final upheaval the rocks of which the mountains are composed existed alternately as dry land and sea-bed. On the other hand, some parts of the earth's surface show no sign of ever having been submerged. They are formed of archæan rocks and appear to have been land-areas from the very earliest geological ages. Much of peninsular India is of this nature, notably the Arāvalli Hills and the Eastern Ghāts. These ranges, now low and irregular, existed as mountain ranges for long ages before the Himālayas were upheaved. They were then probably lofty elevations of which we now see only the remnants left after millions of years of slow disintegration.

70. **Mountain Chains.** Most of the great mountain ranges appear to have been formed by the process of folding, being thrust up by the force of lateral pressure. Both in the eastern

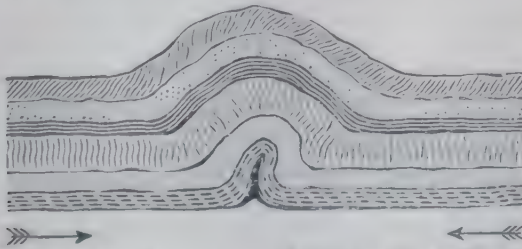


Fig. 31. To illustrate the formation of hills by the folding of horizontal layers through lateral pressure.

and western hemispheres great central lines of folding can be traced, with many minor fold-chains all running more or less parallel to them, for lines of folding never cross one another. In the eastern hemisphere the main folds run, roughly, east and west, and in the western hemisphere north and south. The process of folding seems almost always to have been exceedingly slow. This is conclusively shown in many cases by the fact that rivers flow across the line of folding. They were apparently there before the upheaval began, and the land was thrust up so slowly that they were able to cut through the successive layers of rock as they rose and so to maintain their

course unchanged. Had the land been thrust up more rapidly the course of these rivers would inevitably have been changed. This indeed happened to the Brahmaputra, which was diverted from an eastern to a western course by the folding of the ridges north of Burma. Along a line of fold-mountains the spurs which branch off on either side, usually almost at right angles to the main line, are parts of the same great fold. The deep ravines between neighbouring spurs are most frequently ruptures in the folded mass greatly enlarged by erosion.

71. Volcanoes are cone-shaped mountains which have an opening in their centre, called the *crater*, communicating with the molten mass below. When the crater is closed and



Fig. 32. The summit of the volcano Gotopaxi.

eruptions no longer take place the volcano is said to be *extinct*. There are many hundreds of extinct volcanoes known, and probably a still larger number exist beneath the waters of the sea. Volcanoes are seldom constantly active, but have brief periods of vigorous activity alternating with longer periods of rest. Occasionally, after a period of rest so long that it has been considered extinct, a volcano will burst into life with all the greater violence because of the vast masses of solid rock which, after centuries of cooling, block its crater and have to be dislodged. A volcano in action throws out hot stones,

dust, and molten rock, or lava, often in vast quantities and with immense force ; frequently, also, steam and noxious gases ; and, occasionally, boiling mud. Volcanic mountains have been built up by their own action, the stones, etc., which they eject falling back upon their slopes and being compacted by vast streams of lava flowing from the crater and solidifying round the base and sides. Hence their conical form.

72. The point at which a volcanic eruption takes place is believed to be a crack in the earth's crust, a fracture in the layers due to violent upheaval or subsidence. Most volcanoes are near the sea, and at places where the coast line has a sharp incline and the sea-bed sinks quickly to a great depth. The increase of pressure to which an eruption is due is believed to be caused by water percolating through the rocks and being changed to steam by the internal heat.

73. As the crust of the earth has become thicker outflows of molten rock have become both rarer and less abundant. Probably in early ages the flow was from vast cracks and fissures rather than from comparatively narrow craters, and was therefore less explosive in character and much more continuous. In middle geological ages peninsular India was the scene of a long series of eruptions which covered an area of more than 200,000 sq. miles with almost horizontal layers of volcanic rock, which in some parts are still more than a mile in thickness (see § 248).

74. Closely connected with volcanoes are **Earthquakes**. An earthquake is an upheaval of the ground in a series of waves propagated in every direction from a centre of disturbance. Recent observations seem to show that this centre is seldom more than 10 miles from the surface. The waves may be so slight as to be only just perceptible, or so great as to shake down solid buildings. They sometimes permanently raise or depress portions of the land, or make great rents or fissures in it. Slight tremors or vibrations of the earth's crust may be detected almost every day in all parts of the world, but violent earthquakes only occur near well-marked lines of weakness in the earth's crust. "Wherever," says Prof. Milne, the greatest authority on the subject, "we find mountains which are geologically young, where the process of rock-folding may yet be in progress, there we find earthquakes. Should these regions of rock movement be near a sea or an ocean, we also

find volcanoes." One such line of weakness, by far the greatest and best defined, runs from Cape Horn up the west of South America, through Central America, along the Rocky Mountains and across the North Pacific, then in a south-westerly direction by Japan and Western Asia to Java and Sumatra, and thence south-east to New Zealand. Two great Antarctic volcanoes, Mount Erebus and Mount Terror, probably indicate the southern extremity of this line.

75. Organic Rocks. Some of the rocks of which the solid ground is built up are composed of the remains of plants and animals. Such are called organic rocks. The most important of these are coal, and limestone.

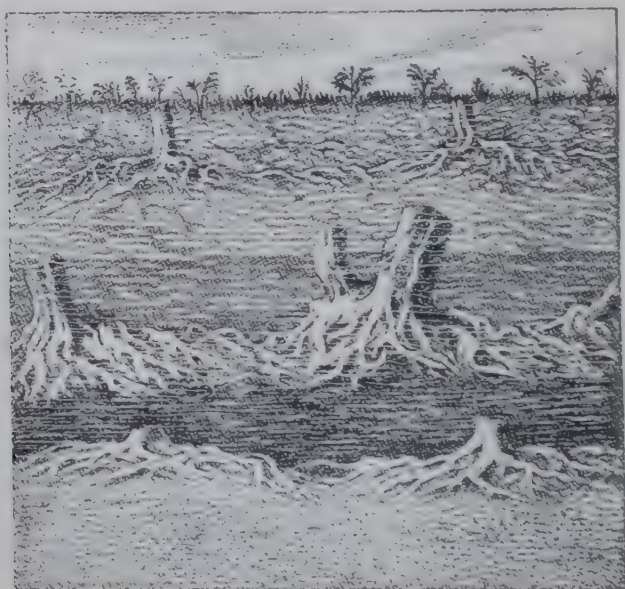


Fig. 33. Section of an Irish Peat Bog showing the remains of three successive forests.

76. The chief **coal beds** belong to the more ancient strata of the earth's crust, and are the remains of primeval forests. By the slow action of pressure, due to the increase of deposits above, accompanied by certain chemical changes induced by heat, the vegetable remains have been "mineralised," losing most of the elements of which they were originally composed save the carbon, and being pressed together into hard layers. As a rule, the older the coal the harder it is, and the greater is the percentage of carbon which it contains. **Graphite** (the material

of which lead-pencils are made) is almost pure carbon similarly formed. We can trace the earlier stages of the formation of coal in peat-bogs which are common in many parts. Such bogs are formed in marshy districts where the rank vegetation remains undisturbed. The level of growth is gradually raised by the remains of former growth, and if we cut a few feet below the surface we find nothing but a dense mass of vegetable fibres. This is the **peat**, which when cut and dried forms excellent fuel. If through any cause (e.g., a slight subsidence), a peat bog is flooded, a layer of mud is soon deposited, by the weight of which the peat is more closely compacted. In Ireland peat bogs occur which show the result of two or three such floodings, and a section of them exhibits the remains of successive periods of vegetable growth, the lower ones being compressed almost into the first stages of coal.

77. The various forms of **limestone** (of which the most characteristic are **chalk** and **coral**) are the remains of animal

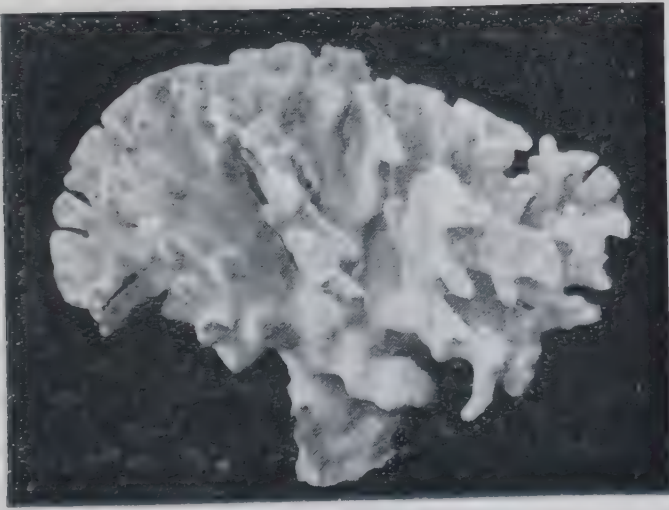


Fig. 34. Coral

organisms which have the power of extracting from the waters of the sea the carbonate of lime of which their skeletons or shells are built up. **Chalk** is the product of one of the smallest of these little animals, and is composed of their skeletons originally deposited on the ocean bed and closely compacted into solid rock by long continued pressure. Vast chalk beds exist in various parts of the earth all of which have thus been formed at comparatively great depths and then slowly thrust up

78. Coral is more interesting because of its surface distribution and the beauty of its forms. It is built up of the skeletons of the coral polyp, which can flourish only near the surface of the sea and where the water is comparatively warm. It is thus chiefly confined to tropical waters. The coral polyp has raised vast reefs skirting the coasts of many tropical countries. The most striking example of these is the Great Barrier Reef, which extends for over 1000 miles off the north-east coast of Australia. An almost innumerable number of islands in mid ocean are also due to its activity. These islands are raised upon submerged peaks which approach (or did once approach) near enough to the surface for the polyp to build upon them. In many cases coral islands are in the form of rings, showing, probably, that they have been built round the coast of a projecting peak which has since been submerged, the coral surface being slowly built up as its foundation sank. (See Fig. 170).

79. Rock Erosion. Wherever rocks are exposed to the action of air and water heat and cold, they gradually crumble. Such crumbling is termed *weathering*. Alternations of heat and cold alternately expand and contract the rock, and often crack it or cause flakes to split off from its surface. When rain falls it settles into the cracks, sometimes dissolving and carrying away constituents of the rock and so reducing its cohesion. Or if the water remains in the crack and a sharp frost ensues, the freezing water will, owing to its sudden expansion, split the rock with great force. Every such crack or split exposes a greater surface to similar influences, and so increases the rapidity of reduction. Purely mechanical forces also assist. The split rocks fall and are further broken. Or in the bed of a mountain torrent they are exposed to the erosive action of flowing water, and when the pieces are small enough to be swept onwards by the torrent they are ground down by continual attrition. In all these ways the solid masses of surface rock are being gradually reduced to minute particles.

80. Now where the surface is fairly level the crumbled results of weathering accumulate and form a covering which protects the rock below against further disintegration. But whenever, as on mountain sides, the crumbled matter is washed away, the rock is left exposed and the process of disintegration

goes on. This is why the tops of mountains wear away (unless, indeed, they are high enough to be protected by a perpetual covering of snow or ice) while the rocky beds of the valleys change but little. The mountain tops are exposed to the full effects of heat and cold, wind and rain. By the long-continued weathering of their more elevated portions many mountain ranges have lost the greater part of their original height. The following diagram (after M. Emile Chaix, a well-known Swiss Geographer) gives a section of the St. Gothard group of the Alps showing their present outline and the "lay" of their strata. The dotted lines show the hills as they most likely were before the long process of erosion began.

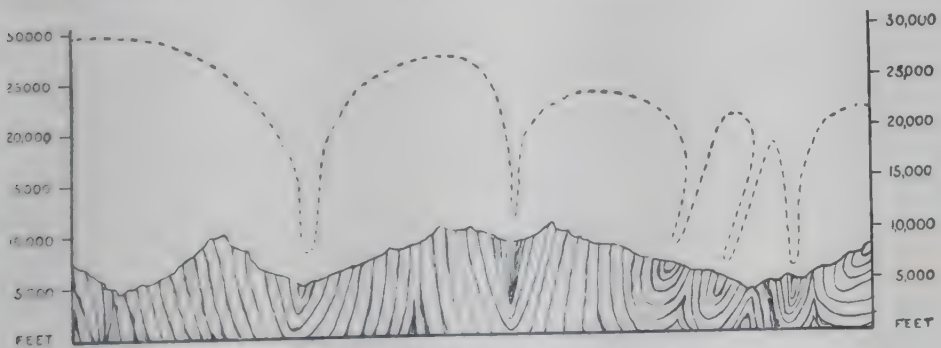


Fig. 35. Section of the St. Gothard Alps.

81. Rocks differ greatly in their composition and hardness and their power to resist erosion. Some, like limestone, yield with great readiness, whereas others, like granite, crumble with extreme slowness. This greatly influences the form which the hills assume under the influence of weathering. A chalk-built country, such as the south-east of England, is always a land of gently sloping "downs," while a region of archæan rock, like much of peninsular India and especially the Eastern Ghâts, presents a wild and broken surface with many jutting crags. Wherever the strata are nearly perpendicular, as in the St. Gothard Alps, the harder rocks are left as mountain peaks. The close proximity of hard and soft rock sometimes causes mountains to be carved into all sorts of fantastic shapes.

82. The soil is the ultimate product of weathering. It is generally deep in the valleys and shallow on the hill sides. Soils vary according to the rocks from which they are derived, though these differences are greatly modified and the soil

enriched by the influence of animal and vegetable life. Some soils are light and porous, easily drained and quickly dried. Others are heavier, and have a great capacity for retaining water. The weathering of the archæan rock of the Eastern Ghâts gives a light and sandy soil through which the water quickly percolates. The weathering of the volcanic rock which prevails in the western part of the Deccan yields a rich, black, water-holding soil. Some soils are therefore favourable to one crop, some to another. The black soil of the Deccan is commonly known as "cotton soil," its peculiar suitability for that particular crop giving it its name.

THE WATERY ENVELOPE OR HYDROSPHERE

83. The surface of the globe is divided unequally between land and water, only five-sixteenths being land and the remaining eleven-sixteenths water. The highest point of land yet measured is about five-and-a-half miles above the level of the water, and the greatest depth of water yet sounded is slightly more than this. But the average level of the land-area is far less than the average depth of the water-area. The actual bulk of the water on the surface of the globe is sufficient to surround the earth as an unbroken ocean a mile and three-quarters deep.

84. This vast watery envelope is of the utmost possible importance to the earth. Water is one of the principal agents that mould and fashion the land surface: but this is one of the smaller of its services. It is as absolutely essential as the rays of the sun to every form of life upon the earth. For not only is it directly necessary to every living organism, but also, by a power which it possesses above all other substances of absorbing heat and giving it out again, it is the great moderator of heat and cold, and keeps the surface of the earth within those limits of temperature beyond which life is impossible. Since many of the phenomena which the hydrosphere presents depend upon this property of water it is necessary that we should clearly understand it.

85. Water exists in the three forms of solid, liquid, and gas. Take a pound of ice at freezing point, 32°F., and observe what happens under the influence of heat. It slowly melts and

presently will be a pound of water at 32°F . It is no warmer (as measured by the thermometer) than when it was ice, although in melting it has absorbed enough heat to raise a pound of water by 90°F , i.e., half way from the freezing to the boiling point. This large amount of heat has not been destroyed but has been hidden or made latent. It is called the **latent heat** of water. If the pound of water was to become ice again all this latent heat would be set free, and would become **sensible heat** once more.

86. Now raise the temperature of the water a few degrees. If you do it carefully you will find that it takes far more heat to make water warm than to warm any other substance. Suppose you try to warm the pound of water at 32°F . by slowly pouring into it a pound of mercury at 92°F . You would naturally expect that, as there was a pound of each and 60° difference in temperature, the mercury would give the water 30° of its temperature and that both would then be 62°F . This would not be the case, however. The water would take so much heat from the mercury that the temperature of the latter would fall to 34°F . and yet the water would only be raised to 34°F . It takes thirty times as much heat to raise a pound of water one degree as to raise a pound of mercury one degree. This is what is called **specific heat**, and if we call the specific heat of water 1, the specific heat of mercury will be .03. The specific heat of water is more than four times as great as that of any other substance.

87. When water cools it gives off again just as much heat as it took in while growing warm. It therefore follows that when water is warmer than surrounding objects it warms them without becoming proportionately colder itself, and when it is colder than surrounding objects it cools them without becoming proportionately warmer itself. This is why countries near the sea, or well watered by rivers, etc., never experience the extremes of heat and cold common in dry inland tracts.

88. But this is not all. Water evaporates at any temperature, i.e., it passes as invisible vapour into the air. If the air be fairly dry water evaporates with great rapidity. There is always more or less vapour in the air, as can be seen by putting a lump of ice into a tumbler, when some of the watery vapour of the air will speedily condense on the outside of the cold glass. Sometimes the air is *saturated* with vapour, i.e., contains as much as it can take up, and then evaporation does not take place at all. At other times it contains very little, as, for example, when hot land winds blow, and then evaporation proceeds with great rapidity. The warmer the air is, the greater is the amount of vapour it can contain. At every temperature there is a definite amount of water which the air can hold as invisible vapour.

89. Now we have seen that when ice becomes water—i.e., when water changes from its solid to its liquid form—a large amount of heat is rendered latent. This is the case, and to a much greater extent, when water changes from its liquid to its gaseous form, i.e., when it evaporates. When a pound of water at a given temperature passes into a pound of vapour at the same temperature it absorbs and renders latent as much heat as would be required to raise 5.36 pounds of water from freezing point to boiling point. When this vapour condenses again into water all this heat is given off.

90. It will now be readily understood how the phenomena of evaporation and condensation tend to equalize the temperature of the earth. Evaporation cools and condensation warms the surrounding air and earth. A familiar illustration of the cooling effect of evaporation is seen when water is kept in porous earthenware vessels. A portion of the water evaporates from the outside of the earthenware and keeps that within cool. The hotter and drier the surrounding air is the cooler can the water thus be kept.

91. The watery vapour in the air keeps the earth warm in another way. It acts as a blanket—hindering the escape of heat. When the air is dry the earth radiates its heat—i.e., casts it off into space—with great rapidity. But if there is much vapour in the air radiation goes on but slowly. In the middle of a tropical desert far from the sea, where the air is always dry, the thermometer will sometimes register a difference of 90° between the day and night temperatures. After a day of insufferable heat the earth rapidly cools and water freezes on its surface before morning. Such great and rapid changes are unknown where the air is moist. On the sea coasts within the tropics the night and day temperatures seldom vary more than 8° or 10°F .

THE CIRCULATION OF WATER

92. Under the influence of heat and gravitation there is a steady circulation of water from the sea to the land, and back again from the land to the sea. The sun causes the evaporation of immense quantities of water from the surface of the sea. The winds carry this watery vapour over the land, where it falls as rain, snow, etc., and the rivers which drain the land carry it back as water to the sea. Of course it must not be supposed that all the vapour that rises from the

sea falls upon the land ; much falls back into the sea. Nor that all the rain that falls on the land has come directly from the sea ; for evaporation goes on also on the land from the surface of lakes and rivers, from the moist earth, the leaves of trees, etc. But allowing for this it still is true that the sea is the great source of the water which falls upon the land.

93. The familiar forms which water assumes in the atmosphere or in which it is deposited on the earth, are **Cloud, Mist and Fog, Dew, Rain, Hail and Snow.**

Water vapour is as we have seen, invisible, but whenever the air which contains it is chilled beyond a certain point the vapour is rendered visible by condensation into minute particles of water—"water dust" as Tyndall called it. Now, as the vapour-laden air rises from the surface of the land or sea, it soon reaches altitudes at which it loses much of its heat, and a portion of its vapour condenses into *clouds*. Clouds are not vapour, but water existing in particles so minute as to be able to float in the air. *Mists* and *fogs* are similar to clouds, but creep along the surface of the earth or the mountain sides. Warm moist air is often chilled by coming into contact with the cold earth, and so a *mist* is formed. This is the cause of the mists that so frequently occur along the sea coasts in temperate latitudes. Within the tropics mists are seldom seen except on the mountains, for the difference between the temperature of the air and the land is less marked. A *fog* does not differ from a mist save in its density. In cities where there is much smoke and dust the particles of water adhere to minute solid particles floating in the air, and fogs of such density are sometimes produced as to make day almost as dark as night.

94. **Dew** is the gentlest form in which the vapour of the air is deposited upon the earth. When the night is clear, i.e., when there are no clouds overhead, the earth radiates its heat very rapidly, and after sunset quickly cools. If there is no wind the air in contact with the ground is chilled, and its vapour is deposited upon the leaves of trees, the grass, stones, etc., in proportion to the rapidity with which they part with their heat. The deposit of dew is precisely similar to the film which gathers on the outside of a tumbler when a piece of ice is put into it. When the air is reduced to freezing point before the difference in the temperature of the air and the ground is sufficient to cause dew, *hoar-frost* is produced—what

would otherwise have been tiny particles of water being deposited as particles of ice.

95. Rain. The particles of water of which a cloud is formed attract each other and tend continually to run together into drops. When this occurs the atmosphere can no longer support them and they fall as *rain*. A fall of rain may be caused by anything which cools the air and so reduces its vapour-bearing power. Thus if a current of cold air meets a current of warm air heavily laden with moisture, rain is the result. The effect is the same if a moisture-laden current rises to a higher level, for then it is cooled by its own expansion. As mountain slopes force the winds that blow against them upwards and so lead to a deposit of their vapour, a mountain chain usually receives a much larger rainfall than the surrounding plains. Extensive forests have also a great influence on the rainfall, owing to the fact that they keep the adjacent air comparatively cool. In many parts of the world the destruction of forests has greatly reduced the amount of rain received. Rain is by far the most important form in which the moisture of the atmosphere finds its way back to the earth. The fertility of a country, and, as a consequence, the density of its population, is more largely dependent upon its rainfall than upon any other single cause.

96. Snow. In the higher parts of the atmosphere the clouds are no doubt almost always frozen. Probably they usually begin their descent in that form, melting and forming rain when they reach warmer air. If, however, the air is below



Fig. 36. Forms of Snow as seen under the microscope.

freezing point all the way to the earth they reach the ground as snow. Snow is composed of "flakes" of various sizes, each made up of a multitude of minute particles of ice arranged in many beautiful and symmetrical forms. The **Snow-line** is the height in each latitude at which snow is always found, the warmth of summer being insufficient to melt it. Near the

poles the snow-line is at sea level, but it gradually ascends as we pass from the poles to the equator till within the tropics it varies from a height of 13,500 to 19,000 ft. The snow-line is higher where the air is as a rule fairly dry, lower where it is usually well charged with moisture. The snow-line on the northern slopes of the Himālayas, which face the arid plateau of Tibet, is 3000 feet higher than on the southern slopes which face the well-watered Indo-Gangetic plain.

97. **Hail** consists of little pellets of ice which have been formed, during descent, by the minute ice particles gathering into compact masses round a particle of dust. Hailstones are not frozen rain-drops.

98. Most of the water which the clouds thus shed in various forms upon the land finds its way back to the sea through the rivers. A **River** is a stream of fresh water flowing toward the sea, or sometimes towards an inland lake. Another river pouring its waters into it is called a **tributary**. As water can only flow from a higher to a lower level, the tract of country drained by a river and its tributaries slopes gradually on all sides to the **river-bed** and then to the sea. It is, therefore, called the **river-basin**. The high land which separates one river-basin from another is called a **watershed** or **waterparting**.

99. Most rivers begin their course as mountain torrents, and fall swiftly almost to the level of the plains through rocky channels which they have cut out for themselves. During this stage their flow is swift, and their erosive power proportionately great. Many mountain torrents flow at the bottom of steep ravines of their own making many thousands of feet deep. They cannot, therefore, change their course but retain it from age to age, confined by the rocks through which they have cut their way. Such torrents bring down a vast amount of solid matter to the level of the plains. The steep sides of the ravines are continually crumbling and the disintegrated matter, falling into the rushing water, is swept to lower and lower levels. If the rapidity of flow is checked at any point in the descent, so that a lake is formed, this solid matter is deposited, and in course of time a fertile valley is the result, through which the stream flows placidly to recommence its swifter descent further on. Many such valleys have thus been formed, the beautiful Vale of Kashmir being one.

100. When a mountain-stream reaches the plains, it enters upon what we may call the second stage of its life. Its flow becomes slower in proportion to the flatness of the plain, and the silt which it has brought down is rapidly deposited on its banks and bed. In seasons of flood these deposits are again disturbed and carried further down. Sometimes such a river will build up its bed to a level above that of the surrounding plain. Or sometimes, having half filled up its channel, it will, in a season of great flood, overflow its banks. If these banks are soft and easily destroyed they are soon washed away, and the river cuts out a new or auxiliary channel for itself. As it approaches its mouth its flow becomes still slower, till in its estuary it meets and mingles with the tidal waters of the sea. This is the third and last stage of its life. Here the final deposit of its solid matter takes place, and very often the land steadily encroaches on the sea. The old channels, or distributaries, of the river are continually being partially blocked up with silt, and in periods of flood its waters overflow and cut out new channels for themselves by means of which they reach the sea. Much of the silt brought down by such a river when in flood is washed out to sea. There it gradually settles, and the bed of the sea is raised around the river's mouth, or the numerous mouths of its distributaries. Mud islands presently appear, which in course of time are joined to the mainland, and others further out are formed. So the "delta" is always being slowly enlarged, and the land pushed further and further out.

101. A river both drains and waters the country through which it passes, draining chiefly those mountain slopes where rain is abundant, and carrying water to the low-lying plains where it is more needed. Sometimes, especially in India and Egypt, the waters of a river are carried by a vast system of irrigation channels great distances from the course of the river itself, thus fertilizing tracts which would otherwise be barren.

102. **Glaciers** are ice-rivers which occur within the polar regions or above the snow-line in mountainous countries. They are formed by vast quantities of snow pressed together by its own weight, gradually consolidating into clear ice. Glaciers flow steadily though exceedingly slowly. The highest speed ever measured was only 99 ft. in 24 hours, and the great

majority of glaciers do not exceed one-tenth of this rate. Glaciers act much more powerfully than rivers in wearing away the land, cutting deep grooves in the solid rock. They carry down with them great quantities of stones and debris which are piled along their sides and constitute **Moraines**. When glaciers reach the snow-line the ice melts and becomes the source of a mountain torrent. In the polar regions where glaciers flow down to the sea, vast blocks of ice, often



Fig. 37. An Alpine Glacier (the *Mer de Glace*, Mt. Blanc)

thousands of feet in size, break away from them and float into mid-ocean. Such floating blocks of ice are called **icebergs**, and are often a source of great danger to ships.

103. Icebergs are most numerous in the southern oceans. This is due to the fact that glaciers of sufficient size to give off icebergs can only be formed on extensive stretches of land. Now the north pole is surrounded by a deep sea, and all the northern icebergs come from glaciers on the great island of

Greenland. Around the south pole, on the other hand, there seems to be a great stretch of continental land covered by a vast ice-cap. In the southern oceans, therefore, icebergs are larger as well as more numerous than in the northern, and are constantly met with south of lat. 40° S. In the northern hemisphere icebergs are only found in the north-west Atlantic. They float southwards from the coast of Greenland in the cold current that flows from the Arctic Ocean. On the east of the Atlantic the currents are from the south, and are warm. Any iceberg drifting across the ocean is therefore soon melted. It is this warm southern current that keeps the coasts of Norway free from icebergs, while south-east of Cape Race at the other side of the Atlantic, and twenty degrees nearer the equator, they are at certain seasons of the year quite common. Icebergs have a great effect upon the climate of Newfoundland and Eastern Canada, their vast bulk being sufficient to cool the air and water over an enormous area.

104. While most of the water which falls upon the land thus finds its way back to the sea, a portion of it sinks into the earth. Such water often travels for great distances far below the surface, and is ultimately forced to the surface again by the pressure of water sinking from a higher level. Water thus rising out of the earth is called a **spring**. Spring water occasionally contains considerable quantities of various salts which it has dissolved in its journey through the earth. Many springs are held to have great medicinal value on this account. When there are no surface springs, a boring made into the earth to a great depth will sometimes bring water to the surface. Such springs are called **Artesian wells**, from Artois, a place in France, where the first such well was made. When the boring first strikes water it is often found at such high pressure that it shoots high into the air.

105. Hot Springs are those whose waters come from a very great depth where they have been heated by the internal fires of the earth. They are sometimes very heavily charged with various salts and sulphur.

106. Geysers are fountains of hot water—often quite boiling—which act at frequently recurring intervals, the hot water and steam being thrown out with great force. They are caused by water which has collected in a cavity of the deeper rocks being gradually raised to boiling point. As soon as this

takes place the whole volume of boiling water is blown violently out by the expansive force of the steam. A period of repose follows during which water again collects in the cavity, presently to be expelled in the same way. When the vent of the

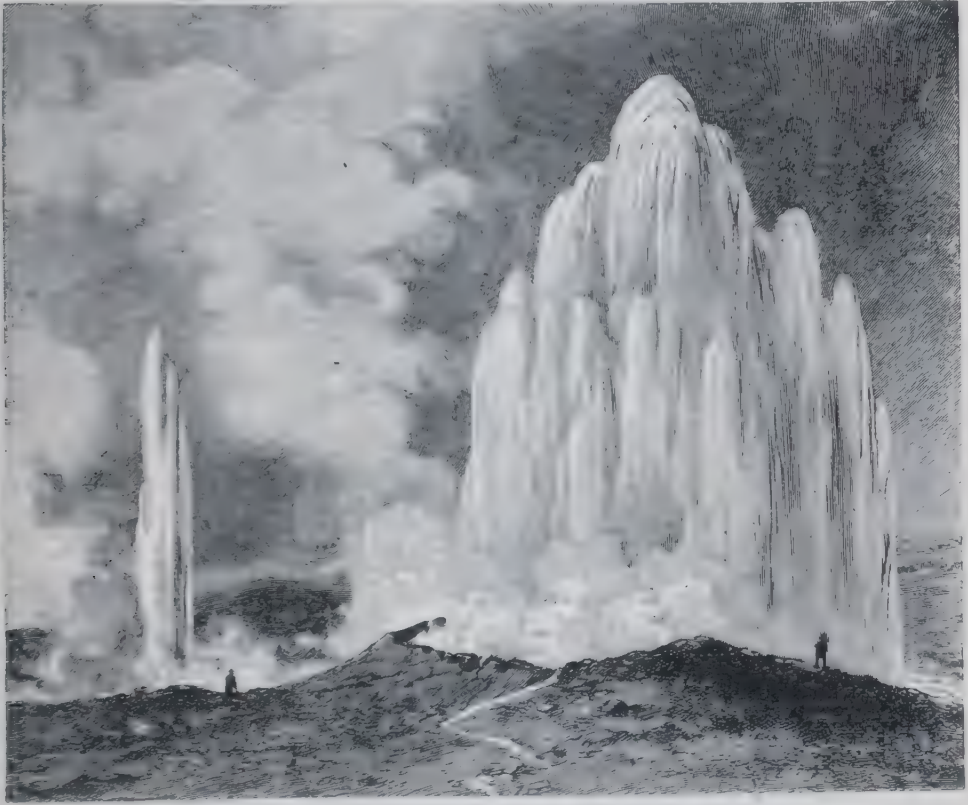


Fig. 38. The Grand Geyser and the Strokkur Geyser, Iceland.

geyser passes through a layer of clay, hot mud is thrown out and what is called a **mud volcano** is formed.

107. This steady circulation of water under the influence of evaporation and condensation—from the ocean to the atmosphere, from the atmosphere to the land, and from the land back again to the ocean—is the chief cause of the **saltiness of sea-water**. The water which rises from the ocean leaves all its salts behind it, and falls upon the land as fresh water. There it again dissolves a small quantity of various salts which it carries with it to the sea. This once more it leaves behind, and so on. All waters therefore are salt which are fed by rivers and reduced by evaporation only. The Caspian Sea and the Dead Sea, for example, are salt lakes, for

while rivers flow into them none flow out. Wherever a lake receives the waters of a river and passes them on in the same way, it remains fresh like the river that feeds it. The ocean and salt lakes would tend to grow more and more salt but for the fact that certain animals and plants that live in them use up the salt as fast as the rivers bring it.

108. Ocean currents and drifts. We have already seen that the waters of the ocean are subject to tides. Far more important, however, are the constant currents, or streams of water, which flow in the oceans, and which, by mingling the warmer and colder waters, serve to mitigate the intensity of tropical heat and the rigours of arctic cold. Ocean currents are caused mainly by the influence of steady winds upon the surface of the water, and by the rotation of the earth. To a smaller extent, also, they are caused by variations in the density of the water, due to differences in temperature or salinity.

109. As the earth rotates the waters of the ocean, moving freely on the surface of their solid bed, *tend to be left behind*. In other words, in relation to their bed the waters move in a direction contrary to that of the earth's rotation, that is they move from east to west. This tendency is greatest near the equator where the motion of the earth's surface due to rotation is most rapid. If there were no great land-masses to check or deflect the currents thus produced, there would be a steady flow of water round the earth in a westerly direction. But this is not all. The rotatory motion of the earth not only tends to *generate* currents in the oceans, but also to *deflect* those generated by any other cause. The reason for this is not difficult to understand. Suppose a current to start from latitude 40° N. and flow southwards towards the equator. At its starting point the water would, owing to the earth's rotation, be moving from west to east with a velocity of about $10\frac{1}{2}$ miles a minute. As it travels southwards the earth below it has an ever increasing rotational velocity, till, at the equator, it is moving at about 17 miles a minute. Now the water would not, moment by moment, acquire the increased velocity of the earth below it, but would tend to lag behind. In other words the direction of the current would cease to be due south and would bend more and more round to the west. If the current were *from* the equator instead of *towards* it the water

110. But in the production of surface currents a still more powerful influence is exerted by continuous winds. Over some parts of the ocean certain winds blow with great steadiness. This is especially the case immediately north and south of the belt of greatest heat, which (on account of the larger extent of land in the northern hemisphere) lies somewhat north of the equator. This belt is a region of calms. North of it the prevailing winds are from the north-east, south of it from the south-east, and as both these winds have an increasingly western "set" as they approach the equator, their current-producing power is exerted in the same general direction as that of the earth's rotation. These two causes, therefore, combine to set up in the oceans continual western currents north and south of the great belt of calms. Two separate, but parallel, currents are thus caused which are known respectively as the **North Equatorial Current** and the **South Equatorial Current**.

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eastwards, and then, having re-crossed the ocean, bends southwards again in the northern hemisphere and northwards in the southern hemisphere, and so returns to the point from which it started. In this way there are **six great ocean vortices** produced, in each of which a vast current flows slowly round an almost stationary central sea. The northern vortices rotate in the same direction as the hands of the clock; the southern vortices in the opposite direction.

112. In the Atlantic and Pacific oceans these great currents are perfectly constant, the size and shape of the vortices being determined by the size of the oceans and the contour of the surrounding land. In each of these oceans also there is an eastern counter-current *between* the two equatorial currents. The northern part of the Indian ocean, however, is divided by the great peninsula of India which stretches southwards almost to the belt of calms. It is also subject to the influence of the *monsoons*, or prevailing seasonal winds, which determine the direction of its water-currents.

113. North and south of these great equatorial systems the currents of the ocean are less regular and uniform. In both the North Atlantic and North Pacific there is a warm current branching off in a north-easterly direction from the point where the equatorial current bends round to the east. That in the Pacific skirts the coast of Japan, and then sweeping across the ocean to British Columbia bends to the south and presently re-joins the equatorial current. It is called the **Japan Current**, or the **Kuro-Sivo** (black water), till it broadens out in the north when it is called the **North Pacific Current**. The corresponding flow in the Atlantic is the famous **Gulf Stream**, so called because a large part of its water, and that the warmer part, issues from the Gulf of Mexico through the Straits of Florida. It travels, as a narrow stream of warm water, in a north-westerly direction till within about 200 miles of the coast of Newfoundland when it bends eastwards and strikes across the ocean. In mid-ocean it divides, and one branch travels southwards along the coasts of Portugal and Africa till it unites with the equatorial current again. The other branch is driven north-east by the prevailing south-west winds, and, as the **Gulf Stream Drift**, washes the coasts of north-western Europe and the northern islands as far as Spitzbergen. Both in the Pacific and the Atlantic there are

counter currents of colder water from the Arctic seas, and in each case these cold currents, in so far as they are surface currents, cling to the western shores of the ocean. That in the Pacific issues from the Behring Straits and is comparatively slight. It washes the coasts of Kamchatka, and then dips below the warmer current from the south. That entering the Atlantic flows on each side of the great island of Greenland. Part of it then skirts the coast of North America as far south as New York, cutting the land off from the genial influence of the

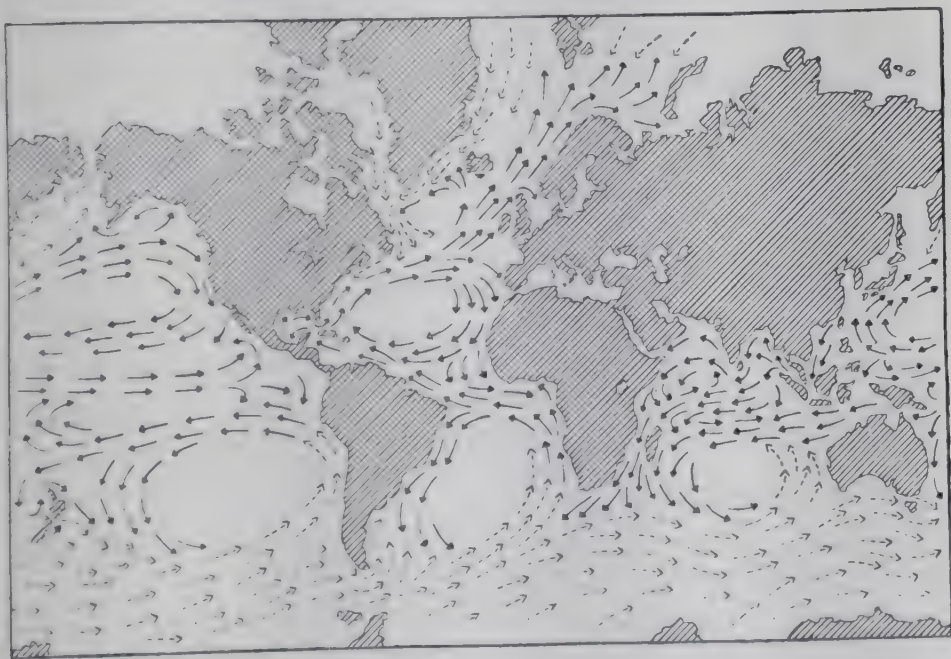


Fig. 39. Ocean Currents.
The colder currents are shewn by dotted arrows.

Gulf Stream by a narrow current of intensely cold water known as the "cold wall." Another part of the current dips below the Gulf Stream and flows as an under-current, as far south as the Bermudas.

114. The southern ocean-vortices closely resemble the northern, except that their direction is reversed. So also do the currents that branch off from them. In the Pacific the **South Equatorial Current** divides in mid-ocean, and the southern portion, bending round upon itself and re-crossing the ocean, unites with the colder drift from the south, called the **Humboldt Current**, then takes a northerly course along the

west coast of South America (where it is called the **Peru Current**) and so completes the vortex. The other branch passes further west, and is deflected to the south by the east coast of Australia. It is there called the **New South Wales Current**. Bending eastwards about latitude 40° S. it divides again and the northern branch passes to the north of New Zealand and then, bending southwards, rejoins the original current. The southern branch flows southwards and ultimately unites with the **Antarctic Drift**. In the Atlantic the **South Equatorial Current** flows westwards from the Gulf of Guinea till near the east point of Brazil where it divides. The southern portion, called the **Brazil Current** washes the east coast of South America as far south as lat. 30° S., then bending round to the east re-crosses the ocean and flows northwards to the Gulf of Guinea along the west coast of Africa. The northern branch washes the north-east coast of South America and flowing through the Caribbean Sea (where it unites with a branch of the North Equatorial Current) enters the Gulf of Mexico, whence it emerges through the Straits of Florida, and, uniting with another branch of the North Equatorial Current, forms the **Gulf Stream**. The **Equatorial Current** in the Indian Ocean divides to the north of the island of Madagascar. One branch washes the east coast of that island and continues a southerly course till it reaches lat. 40° S. It then, like all the rest, turns eastwards, and re-crossing the ocean unites with the colder **Antarctic Drift** west of Australia. The other branch passes round the north of Madagascar and flows between the island and the mainland, and southwards along the east coast of South Africa. It is called the **Mozambique Current**, or sometimes the **Agulhas Current**. Near the southernmost point of the continent it is narrowed by the Agulhas Banks and becomes the most rapid of all ocean-currents, attaining a speed of over five miles an hour. South of the continent it loses its great velocity, spreads itself out over the surface of the water, and, turning somewhat to the east, is finally lost in the antarctic drift.

115. In the great southern ocean there is no such clear and sharp separation between the warm and cold currents as is found in the N. Atlantic and N. Pacific. Owing to the fact that south of the parallel of 50° S. Lat. there is no land save the southern point of Patagonia, the winds are little interfered

with, and blow with wonderful regularity from the north-west almost all the year. There is in consequence a steady set of the surface-currents in that direction, or varying from south-east to east. The warmer water thus slowly passes southwards to the Antarctic regions, and streams of colder water pass northwards, sometimes as under-currents, sometimes upon the surface as drifts. The under-currents seem all to have a north-easterly direction, for the cold water wells up off the western coasts of each of the great land-masses, South America, South Africa, and Australia, and flows northwards along the coasts until it mingles with the warmer waters of the equatorial currents.

116. To what extent the warming of the water by the sun's rays contributes to the generation of the *greater* ocean-currents is a doubtful point, if indeed it does so at all. Were the waters of the ocean heated *from below* (as is the case with the great ocean of air), the warmer, and therefore lighter, water would rise from the depths to the surface, and currents of vast magnitude and rapidity would therefore be set up by the influence of heat alone. But being heated *from above*, and the upper layers of water consequently being diminished in density, the equipoise of the whole mass is not disturbed but rendered more stable. In higher latitudes, however, the cooling of the surface-water below the temperature of that beneath it seems often to give rise to minor currents through the colder and heavier water sinking. This is most frequently the case when the cooling surface-water is more highly charged with salt than that below and is therefore denser at the same temperature. Sea water is always more saline in the tropics than near the poles, and it commonly happens that currents flowing from equatorial to polar regions sink when they reach the latter. A remarkable illustration of this is found in many parts of the southern ocean about lat. 50° S. where the salt currents from the equatorial regions, being chilled by contact with the cold antarctic current, dip below it and continue their journey as under-currents. The same thing happens in the Davis Straits, where a warmer saline current from the Atlantic flows into the Arctic Ocean underneath the cold current travelling in the opposite direction. Similarly Nansen found that in the neighbourhood of Franz Josef Land the Gulf Stream Drift dipped below the arctic waters.

117. Differences in salinity alone not unfrequently cause currents, though such currents are always on a small scale and purely local. A striking illustration is seen in the Straits of Gibraltar. The confined waters of the Mediterranean are much more saline than those of the Atlantic, and therefore an under-current of heavier salt-water flows out of the sea into the ocean, while a surface-current of fresher and lighter water flows from the ocean into the sea.

118. The vast importance of the ocean-currents is due to the fact that they are by far the most powerful of all the agencies whereby the surface-heat of the earth is circulated and equalised. If there were no such currents the heat of the tropics would be intolerable, and yet 40 degrees from the equator every sea-port would be ice-bound for the greater part of the winter. The vast amount of heat carried to northern latitudes by such a current as the Gulf Stream will be better understood if we think for a moment of the enormous volume of warm water which it transports. In its narrowest part, between the Bahamas and Florida, the stream is 30 miles wide, and 3000 feet deep in the centre, and it flows at an average speed of four-and-a-half miles an hour. Hour by hour, therefore, it carries from the tropics to the temperate regions at least 30 cubic miles of water at an average temperature of from 10 to 15 degrees F. above the waters of the Atlantic. It has been calculated that the Gulf Stream alone takes from the torrid zone to the colder northern latitudes about one-twelfth of the entire heat which the torrid zone receives from solar radiation. Yet the Gulf Stream is only one of several such currents, and not the largest. The Kuro Sivo takes twice as much warm water into the North Pacific.

119. The influence of the Gulf Stream Drift over the north-west of Europe may be seen from the isotherms (or lines of equal temperature) on the map of Europe on page 246. It benefits the British Isles and Norway more than any other countries, but its effects are felt to some extent over the whole of western Europe. The sea-ports of Norway are open all the year round, though the coast of Greenland in the same latitude is blocked with perpetual ice. According to its latitude alone London should have a winter temperature of about 17°F. Owing to the genial influence of the Gulf Stream it is 22 degrees warmer than this, its mean winter temperature being 39°F.

THE GASEOUS ENVELOPE OR ATMOSPHERE

120. The **Atmosphere** is a great ocean of air surrounding the earth on every side. It extends to a great height, but grows less and less dense with elevation. Like water, the air is absolutely necessary to the existence of life upon the earth.

The air is composed mainly of two gases, *Oxygen* and *Nitrogen*, less than one-quarter being oxygen and more than three-quarters nitrogen. All animals need oxygen, and could not live without it. There is another gas always present in the air in small quantities, viz., *Carbonic Acid*, which is similarly necessary to the existence of vegetable life. Vegetables take in carbonic acid and give out oxygen, while animals take in oxygen and give out carbonic acid. A certain amount of water is, as we have seen, always present in the air in the form of vapour, but it varies greatly in quantity. Hot air can take up more water than cold air; therefore in warm latitudes, and especially near the sea, the air is almost always heavily laden with vapour; while in cold latitudes, and over the land, it may contain very little indeed.

121. Like all other gases, the air expands and contracts very readily. This it does under the influence of two causes, (1) variations of temperature, and (2) variations of pressure. Air expands when it is heated, i.e., it occupies more space and is therefore lighter, and it contracts when it cools, occupying less space and being therefore heavier. It contracts also when subjected to pressure, and expands again when the pressure is removed.

122. The air at the surface of the earth is much denser than that at a high altitude, because it has to bear all the weight of the air above it and is therefore always under considerable pressure. The weight (or pressure) of the air at the surface of the sea is about 15 lbs. on each square inch. By a well-known law the volume of a gas varies inversely as its pressure. At a height of about three miles, where the pressure of the atmosphere is only about half what it is at the surface of the sea, the volume of a given weight of air is doubled. At a height of 15 miles the pressure is only about 2 lbs. per square inch, and therefore its volume is fifteen times as great as at sea level.

123. The rays of the sun which pass through the air to the earth do not warm the air provided it is fairly dry. The heat

rays pass freely through it to the earth below, which they quickly heat. The lower air is then warmed by contact with the warm land or sea. If, however, there is much moisture in the air, this moisture abstracts a portion of the heat of the sun's rays, and thus the air is warmed directly. It is to this that the dispersion of clouds by the sun is due. The warmer air dissolves the half-condensed vapour and the sky becomes clear.

124. Winds. When the air on the surface of the earth is heated it expands and, thus becoming lighter, rises. Other air must flow in to take the place of that which ascends, and this in its turn is warmed and rises. This is the primary cause of **Winds**, or currents of air flowing from one part of the earth's surface to another. Or, to put the same thing in another way, whenever the air over any particular region grows warmer the pressure is reduced. Now winds always blow from regions of higher pressure to neighbouring regions of lower pressure. They do this under the action of gravity, the heavier air spreading itself out over the bed of the aerial ocean, and so driving the warmer and lighter air to higher levels. Winds are thus the movements of the atmosphere in its efforts to maintain its barometric level in spite of any cause which tends to disturb it.

125. Now the earth is hottest near the equator and coldest near the poles. Near the equator, therefore, the warm air rises, and cold air flows to take its place from the cooler regions north and south. These currents are near the earth, for the air being cold is heavy. But air must also flow from somewhere to take the place of that which flows towards the equator. Accordingly an upper current of warmer and lighter air flows north and south from the equator to the cooler regions. There is thus near the surface of the earth a steady flow of cold air *towards* the equator, and at higher altitudes an equally steady flow of warm air *from* the equator. These currents are, however, interrupted near the tropics, where a belt of higher pressure occurs which produces a prevalence of calms.

126. But now another and modifying cause comes into operation. We have already seen how the rotatory motion of the earth affects the currents of the ocean: it has exactly the same effect upon the currents of the atmosphere. According to *Ferrel's Law* (§ 109) it deflects all winds in the northern hemisphere *to the right*, and in the southern hemisphere *to the*

left. Winds blowing from the poles to the equator are therefore turned in a westerly direction, and become north-east and south-east winds respectively, and those blowing from the equator to the poles are turned in an easterly direction and become respectively north-west and south-west winds. The directions which the primary north and south winds take under the influence of the earth's rotation are shown in the following diagram, where the arrows immediately to the north and south of the belt of equatorial calms indicate the lower and colder currents.

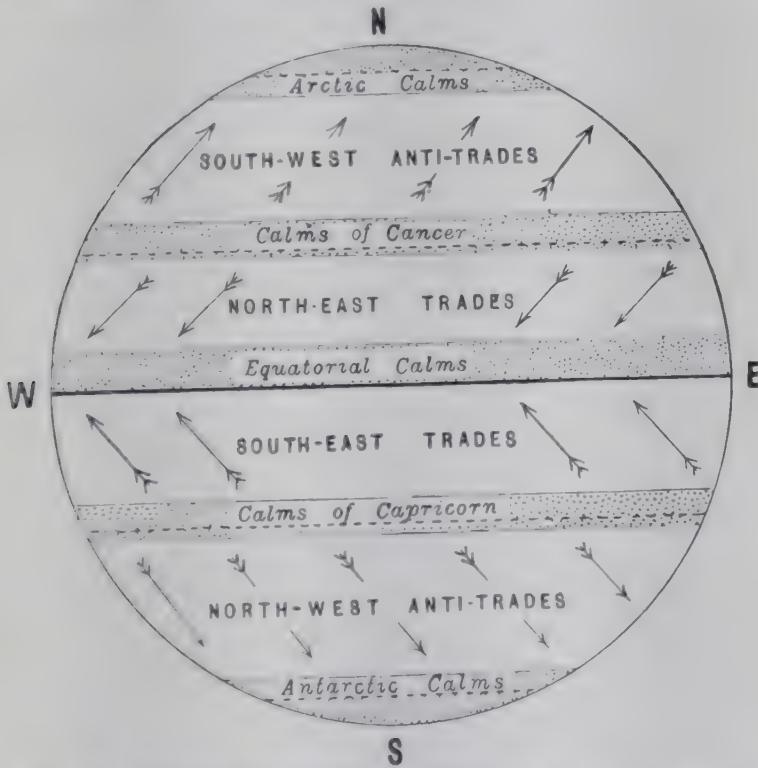


Fig. 40. Showing the regions of Calms and the primary Winds.

127. The Trade Winds. In many parts of the world the air-currents due to these two causes are further deflected by the contour of the land. But in the open ocean they blow with great steadiness and are known as *Trade Winds*. In the northern hemisphere the trade winds blow from the north-east, and in the southern hemisphere from the south-east. They extend from a latitude of from 20° to 35° N. or S. to within a few degrees of the equator.

128. The upper currents, blowing from the warmer to the colder regions, descend to the earth's surface outside the tropics. In the northern hemisphere they blow from the south-west, and in the southern hemisphere from the north-west. These winds are known as the **Anti-Trade Winds**. In the northern hemisphere the anti-trade winds are very variable owing to the extensive land-area. Nevertheless S.W. is the prevailing direction of the winds in the North Atlantic and over the north-west of Europe. In the southern hemisphere, where the land-area is very small, the anti-trade winds blow with such steadiness and force between Lat. 42° and 50° that these latitudes are called the *Roaring Forties*.

129. **Seasonal Winds.** Owing to the fact that the surface of dry land is warmed by the sun's rays much more rapidly than the surface-water of the sea, the influence of large land-areas often suffices completely to change the normal equatorial tendency of winds in the tropics, and to generate winds that vary with the seasons. This is the case in Madagascar, some parts of Africa, Australia, and most of all in southern Asia. Such winds are called **Monsoons**. The monsoons in India blow with great steadiness from the north-east in the winter months and from the south-west in the summer.

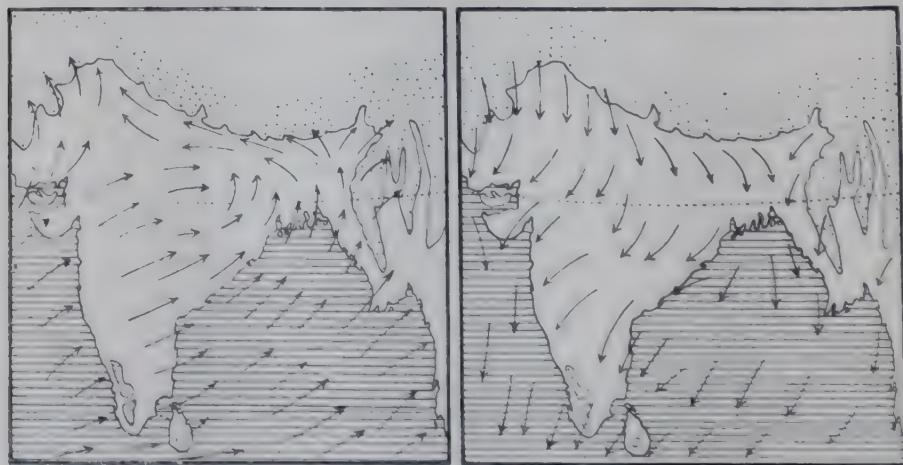


Fig. 41. The Monsoon Winds in India.

130. When the sun is south of the equator the arid plains of Tibet and the whole of central Asia are dry and cold. A vast high-pressure area spreads over almost the whole central portion of the continent from the Sea of Aral to mid-China.

From this region, therefore, a steady southerly current of air flows towards the equatorial belt of low pressure, which, under the influence of the earth's rotation, becomes a north-east wind. This prevails for several months, and may be regarded as the normal wind of these latitudes. When the sun comes north, however, the vast land-area is speedily heated and a low-pressure system is formed with its centre to the north-west of India. This soon neutralises the influence of the equatorial belt of low pressure, and the air from the southern ocean is drawn northwards. The currents thus established become, under the influence of rotation, south-west winds. These blow with great force during the hottest months of the year and bring with them a great store of moisture to fertilise India.

131. Cyclones and Anti-cyclones. Since winds blow from regions of high pressure to regions of low pressure, whenever there is a central area of low pressure surrounded by belts of higher pressures winds will blow *in* towards the centre. And whenever there is a region of high pressure surrounded by belts of lower pressures, winds will blow *out* from the centre. The former constitutes a cyclone, the latter an anti-cyclone. In a



Fig. 42. Showing the direction of the winds in Cyclones and Anti-cyclones north of the equator.

cyclone the tendency of the air is *inwards* and *upwards*; in an anti-cyclone, *outwards* and *downwards*. But these winds are like all others, affected by the rotatory motion of the earth, and are deflected from their original course in complete accordance with *Ferrel's Law* (§ 109). This gives them a more or less circular direction, they move round the centre at the same time as they move towards it or away from it. South of the equator a cyclone moves in the same direction as the hands of a watch, and an anti-cyclone in the opposite direction. North of the equator both these directions are reversed.

132. The force of all winds depends upon the steepness of the barometric gradient, that is, upon the rapidity with which the pressure decreases. In a cyclone the gradient may be so gentle that the wind is never very strong, or it may be so rapid as to generate a storm of the utmost fury. The latter is most common within the

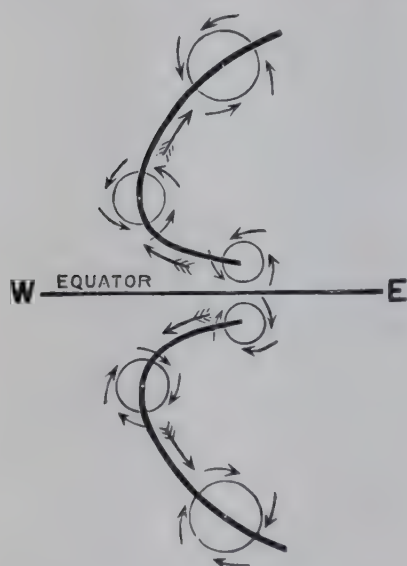


Fig. 43.

Showing the path and rotation of a Cyclone N. and S. of the Equator.

tropics and especially where seasonal winds prevail. The Bay of Bengal is subject to cyclones of a very violent character at the change of monsoons. The centre of depression in a cyclone always moves, and the more violent the storm the more rapidly does it travel. Within the tropics cyclones move with the greatest regularity, travelling first in a westerly direction, then bending northwards and eastwards, or southwards and eastwards, according as they are north or south of the equator. When cyclones of great violence travel over the sea the level of the water is somewhat raised at

the centre of the storm owing to the reduced pressure of the atmosphere. This heap of water forms a *Storm Wave*. If this wave strikes the land where the coast line is straight and slopes gradually, it does little damage; but if it flows into a confined bay the water is banked up and often sweeps over the land for many miles carrying all before it. About thirty years ago such a wave swept over the Sanderbans and up the Hooghly, destroying many thousands of lives.

133. Owing to the fact that in a cyclone the air is ever rising to higher and colder elevations, such storms, whether mild or violent, are almost always accompanied by extremely heavy rains. The reverse of this is the case in anti-cyclones. An anti-cyclone is not a storm at all. The gradients are almost always gentle, and an anti-cyclonic area is usually characterised by cool and pleasant breezes, cloudless skies, and brilliant sunshine. Both cyclones and anti-cyclones are more numerous

in temperate regions than in the tropics, but violent cyclones are naturally most common where the heating power of the sun's rays is greatest.

134. Cyclones in the China Seas are called *Typhoons*; in the West Indies and other parts, *Hurricanes*. A *Tornado* is a small and extremely violent cyclone. The *Simoom* is a hot wind of great force occurring in Arabia, &c. The *Harnattan* and *Sirocco* are hot winds from the interior of Africa.

135. **Sea and Land Breezes.** Near the sea in hot weather, and in the absence of other and stronger winds, there is generally a breeze from the sea to the land in the evening, and from the land to the sea in the morning. These are due to the greater rapidity with which the land is heated by the sun in the daytime and cooled by radiation during the night. During the day the land gets hot and warms the air adjacent

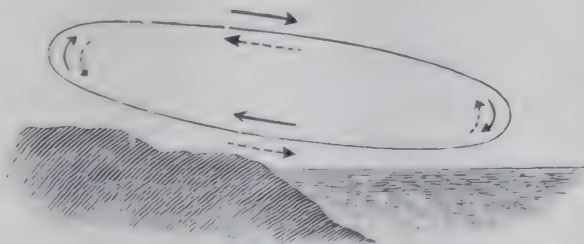


Fig. 44. Land and sea breezes. The line arrows show the evening breeze, the dotted arrows the morning breeze.

to it. The waters of the sea, however, absorb the sun's heat, and the air at its surface is but slightly warmed. The air on the land therefore rises, and the colder sea air flows in to take its place. At the same time a counter-current from the land to the sea is set up in the higher regions of the air. At night the opposite of this happens. The land cools very much more rapidly than the sea, and soon makes the air over it very much cooler than that over the water. The latter therefore rises, and the air from the land flows out to take its place. Again a counter compensating current flows in the upper air. Upon these daily winds the salubrity of many seaside places in the tropics greatly depends.

136. **Climate.** By *climate* we mean the general character of a place as regards the constancy of its temperature, and its various atmospheric conditions. A climate is considered to be a good one which in these respects is favourable to man.

i.e., which most contributes to the full development of his powers and the prolongation of his life, and also to the fertility of the earth upon which he lives. The principal causes which determine the climate of any place are latitude, altitude, the proximity of large sheets of water, or of mountain chains, the prevailing winds, rainfall, and the influence of ocean currents.

137. Latitude. Speaking generally, the nearer a place is to the equator the hotter it is, and the nearer it is to the poles the colder it is ; but this is modified by many local circumstances.

138. Altitude. The higher we go the cooler the air becomes. This is due mainly to the fact that when, owing to a reduction of the pressure upon it, air expands, much of its heat becomes latent. The continual fall in temperature as we reach higher altitudes may be felt in the ascent of a mountain, or still more clearly in a balloon ascent. In a few minutes a balloon will shoot out of the heat of a tropical plain into air below freezing point. A few thousand feet of elevation will reduce the prevailing temperature by many degrees, and some of the most healthy and enjoyable climates in the world are to be found on plateaux within the tropics.

139. The proximity of water. We have already seen that nearness to the sea, or to any large sheet of water, greatly tends to moderate extremes of temperature, rendering the summer cooler and the winter warmer.

140. The nearness of mountains, and especially of mountain chains. These may affect the climate by the shelter which they give from cold winds, as well as by the great influence which they have on rainfall. The southern slopes of most of the mountains of the northern hemisphere enjoy a climate many degrees milder than the northern slopes. They receive the full benefit of the sunshine and are protected from the winds which blow from the colder north. In the southern hemisphere the northern slopes are similarly favoured.

141. The Prevailing Winds. When these are chiefly from the sea the climate is more equable for reasons which we have seen. But such winds are always more or less charged with vapour, and the climate is therefore a moist one. When the prevailing wind comes over long stretches of land it is always drier, and it is also hotter in summer and colder in winter. A good illustration of this is found in South India. During the summer months the prevailing wind is south-west. It

comes up from the ocean laden with moisture, the bulk of which it deposits, as we have seen, on the Western Ghāts, then, travelling across the peninsula, it reaches the east coast as a hot and dry land wind.

142. Rainfall The cause of rain is the cooling of the air in which water-vapour is suspended, leading to the condensation and deposit of the vapour. Currents of moisture-laden air are cooled by contact with the colder land, or with a colder wind blowing from another quarter, or by rising to higher altitudes. The first is the cause of the abundant rainfall which commonly occurs along the sea coast. The influence of cross currents of colder air is the most frequent cause of rain in the temperate regions where the winds do not blow with any constancy. Moist air may rise to higher altitudes either through expansion due to heat, or by the influence of mountains which divert its current, forcing it upwards. We have seen that near the equator there is a continuous upward current of hot, damp air, and, therefore, there is also an almost continuous fall of rain. The zone of calm between the north and south trade winds is the *Equatorial Rain Belt*.

The amount of the rainfall varies greatly in different places. It is greatest on the slopes of mountains which receive their prevailing winds from the sea. In one part of the Khāsi Hills, north of Calcutta, the average fall is 600 inches a year, and at Mahābaleshwar 252 inches. Some districts of India, Burma, Guinea and the northern half of South America are remarkable for their heavy rains. On the other hand some places are almost rainless. A **Rainless Zone** stretches from the Sahara to the Desert of Gobi. Portions of North and South America are also rainless. Trees have a great effect on rainfall. Some parts of America which were once well watered have been rendered almost rainless by the destruction of the forests. It is for this reason that the Government of India have of late years very greatly increased their area of Reserved Forest land.

143. Ocean Currents. The mild and on the whole equable climate of the British Isles is due more largely to the effect of the *Gulf Stream* than to all other causes combined. Almost all other countries in the latitude of England experience extremes of heat and cold that England knows nothing of. The *Kuro-siwo* current similarly warms the eastern shores of Japan and the North Pacific Ocean, though to a less degree.

DISTRIBUTION OF LIFE ON THE EARTH

PLANT LIFE

144. The two most important conditions of plant life are **heat** and **moisture**. Where the temperature is high and there is abundant rainfall, vegetation is most luxuriant, but in proportion as either of these conditions is wanting it becomes scanty and stunted. Speaking generally, therefore, we find the varieties of plant life are more numerous and vigorous, and all the phenomena of growth more rapid, the nearer we go to the equator. **Light** is also an essential condition of plant life.

Deserts, or tracts from which vegetable life is almost entirely absent, may occur in any part of the world, and are due always either to lack of heat or water; the polar deserts to the former and the tropical to the latter cause.

145. Some plants require more heat than others, some more moisture. Some need a steadily sustained temperature and are killed by great variations. Others flourish more vigorously if a cold winter is succeeded by a hot summer. Some plants, again, require a moist air and are almost independent of earth moisture, while others prefer a wet earth. It follows therefore, that the types of plant life prevalent in different countries are very various, and but few of the trees and shrubs which flourish in dry temperate regions are met with in damp tropical ones. The plants which grow in any district are termed its **Flora**.

146. The Plant Life of the earth has been divided into (1) *Tropical*, (2) *Sub-tropical*, (3) *Temperate*, (4) *Sub-arctic*, and (5) *Arctic*, according to the region in which it flourishes. Many plants are found, however, in more than one of these zones, and a few in all but the Arctic.

147. Tropical vegetation extends to about 22° N. and S. of the equator. Within these limits wherever the rainfall is heavy we find the densest forests of the world. This is so in Travancore, Java, and the valleys of such rivers as the Congo and the Amazon. Great trees grow comparatively close together, a thick undergrowth of shrubs makes the forest impassable, while giant creepers twine around the trees and often pass from tree to tree for many hundreds of yards.

The most characteristic tropical plants are **palms** (of which there are many hundreds of varieties), **teak**, **mahogany**, and other valuable timber trees, the **mangrove**, which flourishes in swamps along the sea shore, the **banana** or **plantain**, giant grasses such as the **bamboo**, and an almost infinite variety of trees and shrubs with brilliant flowers and rich perfumes. Various kinds of **cactus** are peculiarly characteristic of America, where numerous giant species are found. This zone yields most of the peppers and spices of the world, and also some of the finest fruits, e.g., the **mango**, **mangosteen**, and **pineapple**, although in variety of fruits the sub-tropical and temperate zones excel it. Its most important commercial products are **rice**, **millets**, **maize**, **cotton**, **indigo**, **tobacco**, **sugar**, **cocoa**, and **india-rubber**.

148. The **Sub-tropical Zone** stretches from 22° to about 35° N. and S. Sub-tropical vegetation is the richest and most varied of all, combining as it does many of the best and most striking productions of both the tropical and the warmer parts of the temperate zones. **Rice**, **indigo**, **cotton**, **sugar**, **maize**, and many other almost equally useful plants grow as well in this zone as within the tropics, while it shares with more temperate regions **wheat** and other cereals, **tea**, and **coffee**. The **date palm** reaches its greatest perfection here.

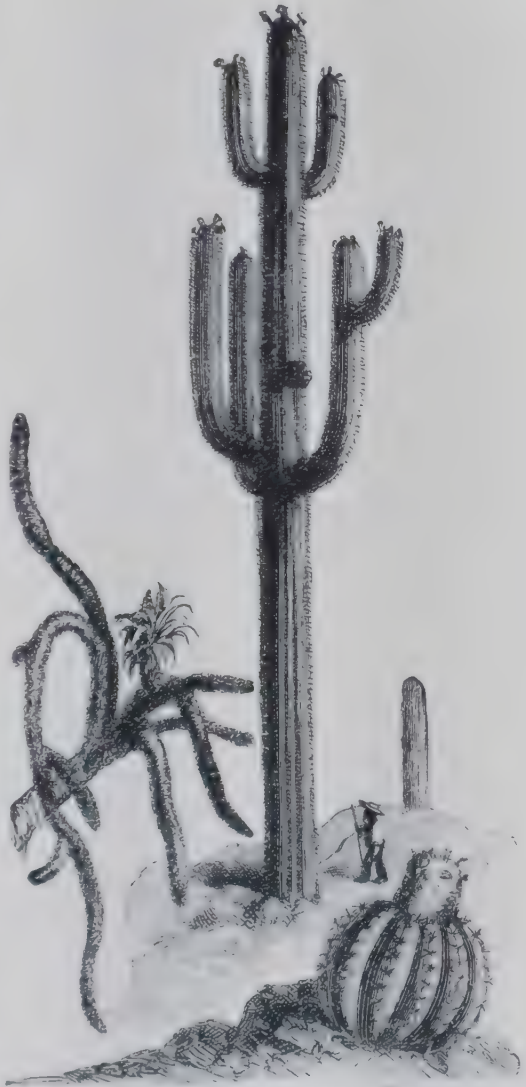


Fig. 45. A Giant Cactus of Mexico.

149. The **Temperate Plant-Zone** extends from about 35° to 58° N. and S. and includes considerable range of climate. In its warmer parts most of the trees are in leaf all the year round, as in the tropical and sub-tropical zones, while in the colder parts all but a few shed their leaves in the winter. In this zone are found trees of great variety and value, including **walnuts, oaks, limes, beeches**, and many others; also the enormous **Wellingtonia** of California, and the **eucalyptus** of Australia, both of which attain a height of 400 feet.

In addition to timber trees, the most useful products of this zone are (1) many cereals, **wheat, barley, rye, oats**, etc.; (2) a great variety of fruits, **oranges, raisins, olives, apples, pears, plums**, etc., and above all the **grape**; (3) **potatoes, turnips, cabbages**, and many other plants with tuberous roots or succulent leaves, of great use as food.

150. The **Sub-arctic Zone** is the region of **firs** and other trees of the Pine order, with sharp needle like leaves. **Barley** and **oats** are also grown, but fruit, with the exception of the smaller berries, is almost unknown.

151. The **Arctic Zone** produces little but dwarfed shrubs of small value, **lichens** and **mosses**.

152. These zones of plant life do not contain precisely the same plants in different parts of the world. Though there is a general agreement, yet in many cases plants that are very characteristic of a particular zone in one country are not found at all in another. The greatest differences of this kind are between the Old and the New World, i.e., between Europe, Asia and Africa on the one hand and the Americas on the other. There are also remarkable differences between Australia and almost all other continents. Plants which are not native to a country are often introduced into it by man. Rice, now largely grown in the southern States of America, was introduced from Asia 130 years ago. Various kinds of eucalyptus, especially the "Blue Gum," have been similarly introduced into India and S. Europe from Australia.

153. Influence of Altitude. As an increase of altitude causes a reduction of temperature, the zones of vegetation found on the slopes of high mountains are similar to the zones of latitude. As we ascend we pass in succession through Tropical, Sub-tropical, Temperate, Sub-arctic, and Arctic vegetation, till we reach the region of perpetual frost.

154. Effect of Cultivation. Many useful plants have been greatly changed and improved by careful cultivation through long ages.

Some of the most valuable cereals (e.g., wheat) are not known in a wild condition, and how far the plants as now grown have been modified by the care of man it is impossible to say. In the case of others the wild original from which the cultivated variety has come is still found, but is so greatly different as sometimes to be hardly recognizable. The majority of our best fruits and flowers are of this kind, and may properly be termed *products of culture*. If such plants are left to propagate themselves uncared for, they soon either die out or revert to their original condition.

ANIMAL LIFE

155. The conditions essential to animal life are *warmth* and a sufficient supply of *food* and *water*. Light is not so necessary to animals as to plants. There are pelagic animals of many kinds, from the minutest creatures known to science to fair-sized fish, which have their natural home in the abysmal ocean-depths far below the light-limit. As warmth is a condition of animal existence, some animals requiring a considerable degree of heat while others flourish best in the cold, there are zones of differentiation in the animal kingdom similar, in some respects, to those in the vegetable kingdom. Speaking generally, animal life is most abundant within the tropical regions, where the largest and strongest animals are found. But these zones are not so entirely dependent upon latitude or elevation in the case of animals as in that of plants, for animals, being endowed with the power of locomotion, have been able to protect themselves against severe changes of temperature as plants could not, and have thus been gradually acclimatized to latitudes far from their original homes.

156. On the other hand the distribution of animal life has been checked by hindrances which have not been effective obstacles to the dispersion of plants. The seeds of plants, in some cases even of the larger orders, may be conveyed for great distances by the winds, or may be carried from land to land by birds. Thus great mountain-chains, stretches of arid desert and arms of the sea, which have been effective barriers to the distribution of animals have in many cases,

been crossed by plants. It follows, therefore, that the areas characterized by particular types of animal life are not zones in the proper sense, but regions delimited more by the ancient configuration of the land than by the distribution of heat.

157. Naturalists have long distinguished six realms or zoo-geographical regions. These are as follows:—

1. The Palæarctic (or Old World Northern) region including the whole of Europe, the greater part of Asia, and the northern portion of Africa. On its northern, western and eastern sides this region has a sea-boundary. On its southern side it is bounded by the great deserts of Sahara and Arabia, the Persian Gulf and the Indian Ocean, the Sulaimān mountains and the Himālayas, and the broken mountains south of the Yang-tse eastward to the China Sea.

2. The Oriental region, which includes Asia south of the Himālayas, Southern China, and the Philippines, the Indo-Chinese Peninsula and the Malay Archipelago including Borneo, Sumatra, and Java.

3. The Australian region, which is divided from the Oriental by what is known to science as **Wallace's Line**, the most remarkable zoo-geographical dividing line in the world. This line passes between the two little islands of Bali and Lombok east of Java, northward between Borneo and Celebes, and then bends round to the east. It forms the northern limit of the Australian region which thus includes the great islands of Celebes, New Guinea, and New Zealand. Geology teaches us that at one time the shallow seas which now divide the Malay islands from Asia on the north, and Australia on the south, did not exist. There was a continental land-connection, large parts of which have been slowly submerged. But soundings show us that along Wallace's Line there is a channel between the islands considerably deeper than any portion of the neighbouring seas, and it is certain that long before Celebes, New Guinea and Australia were separate islands, or Sumatra, Borneo and Java were cut off from the continent of Asia, this deeper channel formed the line of division between the northern continent and the vast southern island. The existence of such a line of division in pre-historic times accounts for the striking contrast now observed between the faunas of the Oriental and Australian regions.

4. The Ethiopian region, which includes the whole of Africa south of the Atlas mountains, and the island of Madagascar.

5. The Ne-arctic (or New World Arctic) region, which includes Greenland and the whole of North America as far south as Mexico.

6. The Neo-tropical (or South American) region which takes in the whole of Central and South America.

158. Many species of animals are common to all these regions, and still more to more than one of them. But even in the same species there are remarkable variations between one region and another, showing doubtless the long influence of long ages of separate development. Each region, moreover, is characterized either by species peculiar to itself or by a marked absence of species elsewhere found.

159. The **Old and New Northern regions** are in many points closely similar. The *white polar bear*, *reindeer* and *arctic fox* are abundant in both, so also are many varieties of *deer*. The *whale* and the *walrus* abound in the oceans, but are not confined to these regions. The *buffalo* of the Old World has its counterpart in the *bison* of the New, the *hare* in the *prairie-dog*, the *rabbit* in the *lemming*.

160. The **South American region**, the **Ethiopian** and the **Eastern** have close similarities as well as striking contrasts. The Old World is far richer than the New in large quadrupeds and hoofed animals, many species of which e.g., the *elephant* are not found at all in the latter. The *monkeys* of America also are much smaller than those of Asia and Africa, the larger species of *ape* being entirely absent. The *lion* is almost peculiar to the Ethiopian region and is represented in South America by the *puma*. The *leopard*, common in the Ethiopian and Eastern regions, has its counterpart in the *jaguar*. The *llama* of the Andes corresponds to the *camel* of the Old World, and the South American *rhea* represents the *ostrich* of Africa. The *hippopotamus*, *giraffe* and *zebra* belong to the Ethiopian region alone, where they are exceedingly common. The Eastern region as a whole contains a far larger number of flesh-eating animals (*carnivora*) than either the Ethiopian or Neo-tropical regions, and greatly surpasses them also in the variety and beauty of its birds and insects.

161. But the **Australian region** presents a stronger contrast to the rest of the world than is to be found between any other two regions. Almost all the species of *mammals* (i.e. animals that suckle their young) common to the rest of the world are absent here, unless, indeed, they have been specially introduced by human effort. Their place in the fauna native to the region is taken by *marsupials*, a class of mammals which are provided with a pouch in which they carry their young for some time after birth, and *monotremes* or egg-laying mam-

mals. The latter are not found in any other region, and only one species of marsupial is known elsewhere, the *opossum* of America. The *ruminants* which chew their cud and have cloven hoofs (e.g., camel, ox, buffalo, bison, sheep, deer), and the *carnivora* (e.g., lion, tiger, leopard, etc.), which together form so large a percentage of the mammals in all other countries, are entirely absent; so also are the *insectivora*.

162. The actual present distribution of animal life has been greatly influenced by human effort, and in most places animals live and thrive in a domesticated state which are not native to the region. The *horse*, *ass*, *dog*, *ox*, *sheep*, and *cat* are now found almost everywhere, and the *deer* and camel flourish far beyond their true *habitat*. These animals, with many others, have been greatly influenced by breeding and have been acclimatized in some cases to zones of temperature that would have been fatal to them in their natural state. The *dog* now flourishes from the poles to the equator, and there are very few countries in which the *horse* does not thrive. On the other hand man has waged unceasing warfare against predatory animals of all sorts and in many civilized countries important species have become extinct. *Wolves*, which were once common in Britain, are now no longer found there, and in India the *tiger* has been very nearly banished to the hill-slopes or the lowland jungles.

MAN

163. It is now admitted on all hands that the human family is *one*. Greatly as the various races of mankind differ in physical and mental endowments, they must all be regarded as descended from one common stock, dispersed throughout the world long ages ago and separated now only by those differences in mind and body which development amid different surroundings have induced.

164. The total population of the world is now a little over 1,500 millions. Four great divisions are commonly recognized—the *White* or *Caucasian*, the *Yellow* or *Mongolian*, the *Red* or *American Indian*, and the *Black* or *Ethiopian*.

165. The Caucasian or White division. The original home of the Caucasians appears to have been South-western Asia and North Africa whence they spread in early ages over the whole of Southern Europe, Southern Asia as far as the Bay of

Bengal, and parts of South-eastern Asia. They now occupy almost the whole of Europe, in Asia have spread considerably into Manchuria, Korea and North Japan and have colonized America, South Africa, Australia and New Zealand. They include the **Aryans** who have peopled the greater part of Europe, West Central Asia and India, the **Dravidians** of South India, the **Hamites** of North Africa and the **Semites** of North Africa, Syria and Arabia, as well as a large number of smaller peoples such as the **Samoans**, the **Maoris** and the **Hawaiians** and other tribes in Malaysia and Japan.



Fig. 46. A Hamite of N. Africa.



Fig. 47. Georgian.

166. There are two sections of Caucasians, the *fair* and the *dark*. Both are distinguished by prominent straight or aquiline noses, low cheekbones and regular features, and the race as a whole exceeds all others in enterprise, activity and imagination. It is a remarkable fact that all the great empires and civilizations of the past, with the single exception of the Chinese, have been developed among the Caucasian peoples. Their total number at the present time is estimated at 775 millions.

167. The **Mongolian** or **Yellow** division seems to have had its original home in the uplands of Tibet. It has spread

over the greater part of Northern and Eastern Asia and the Indo-Chinese peninsula, Hungary, Lapland and Finland. By colonization of recent years it has largely invaded Australia, South Africa, and America. Its physical characteristics are straight hair, high cheekbones, and small, oblique, black eyes. In complexion there is less variety than among the Caucasian. Mentally the Mongolians are stolid and sluggish, but have great pertinacity and perseverance. They number about 540 millions.



Fig. 48. American Indian.



Fig. 49. Mongolian (Chinese).

168. The Red or American Indian division. This race is frequently made a section of the Mongolians, and in many respects it seems to stand physically half-way between the Mongolian and the Caucasian, Mongolian characteristics predominating. Its original home was the whole of the Americas, in parts of which it developed in bygone ages a considerable civilization. It is a dying race, however. There are to-day not more than 10 millions pure Red Indians, chiefly confined to the warmer parts of North and South America. The race has largely mingled with others, and it is estimated there are at least 12 millions of cross-breeds. Physically, the Red Indians are characterized by massive, projecting jaws, prominent nose and cheekbones, small black eyes and com-

plexion from copper to yellowish-brown. Mentally, they show no great alertness, but are cautious and moody.

169. The **Black** or **Ethiopian division** falls into two clearly separated sections, the *eastern* and *western*. The eastern had its original home in Australia, New Zealand, most of Polynesia, the Andamans and the Philippines, while the western section peopled Africa south of the Sahara, and Madagascar. The eastern section has not spread, and though western Ethiopians (*negroes*) are now found largely in America and the

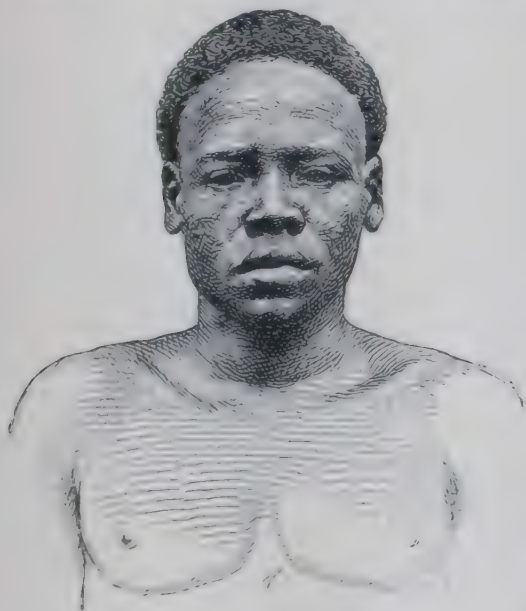


Fig. 50. A West African Negro.



Fig. 51. A Zulu Kafir.

West Indies they were originally carried there as slaves. The mental characteristics of both sections are of a low type and unprogressive. The westerns are sensuous and indolent, the eastern cruel and bloodthirsty. The westerns have woolly hair, prominent jaws and cheek-bones, flat noses and thick lips. The easterns are of lower stature than the westerns, have shaggy hair and thinner lips. Neither section has developed any religion higher than fetishism. The **Papuans** are the most typical section of the eastern Ethiopians and on the whole the most vigorous. The **Bushmen** of South Africa, the natives of Australia (often called **Australian Bushmen**) are low and diminutive types, and both are rapidly disappearing before civilization. Most of the western section are vigorous and very prolific.

170. Civilization and Government. In many parts of the world there are still tribes in a savage condition living mainly by the chase, amongst whom cultivation of the soil is hardly known. In other parts, especially in central and west-central Asia, there are nomadic pastoral races who have no fixed settlements. But the great majority of the human family to-day are permanently settled upon the land, and are formed into civilized or semi-civilized communities in which the rights of the individual are subordinated to those of the tribe or nation.



Fig. 52. Australian Bushman.



Fig. 53. South African Bushman.

171. The development of social and political institutions is determined mainly by the character of each race, the nature of its environment, especially as to climate, and the struggle which it has to maintain against the aggression of surrounding peoples. Europe, Asia and America present striking contrasts in their political organizations. Asia and Eastern Europe have been for many centuries the seats of **absolute** or **autocratic** governments. In such governments the people have no share and cannot control the will or caprice of the ruler. No Asiatic country, save Japan, has limited the power of its ruler by a definite constitution. Even governments founded in Asia by Europeans are all of the autocratic type. Western Europe, with the exception of Switzerland and France, is the sphere

of **constitutional monarchies**. In such a monarchy the Sovereign's power is prescribed or bounded by the will of his subjects expressed through an elected representative body. A **republic** is a State governed by rulers who are chosen for a specified term of authority by the vote of the citizens. America is emphatically the home of republics, and, though this type of government nominally gives the whole power to the people, some of the South-American States are corrupt and oppressive.

172. The Growth of Towns. In modern days the growth of towns on particular sites is almost always due to one or more of three reasons. A site may present (1) special natural advantages for some particular manufacture, as when the presence of rich iron ore and coal leads to the development of a great iron industry. Or it may offer (2) peculiar facilities for commerce, where the produce of different lands or districts may most easily be brought together for exchange. Such sites are natural harbours, the mouths of navigable rivers, the junctions of inland trade routes, etc. Or it may be (3) that a site presents such natural attractiveness, combined with a healthy and invigorating climate, that it becomes a sanatorium, or a holiday resort. This last is an essentially modern cause of towns, and is due to an increase in the wealth and leisure of the people, as well as in the facilities for travel. It is naturally, therefore, most operative in Europe and America, where a multitude of towns trace their growth and prosperity to no other cause. But it has also been operative in India, and such hill stations as Simla, Darjeeling, Ootacamund, etc., owe their existence to it alone. Such towns, are, however, of less importance than those whose origin is to be ascribed to the other causes named. Though they may grow to considerable size and wealth they exercise no great influence on the **development and destiny of a people**. -

173. But in ancient times (1) political and (2) religious considerations had more to do with the founding of towns than had commerce. Wherever a powerful Chief settled, people flocked to him, partly for defence and partly for trade, and a town soon grew up which became his capital and the seat of his government. The site of such a town was chosen not so much for commercial as for military reasons. It had, indeed, to be situated, if possible, in some place to which the supplies needed by his retainers and army could be easily brought.

but it was still more needful that it should be in a good strategic position, well adapted both for defence and as a base for attack. A large number of modern towns had this origin. Many others owed their origin to religion. The presence of a famous shrine, or, in India, the proximity of a sacred river, attracted annually multitudes of pilgrims whose requirements in the way of accommodation and provisions furnished lucrative employment for a large resident population.

174. When once a town has been founded, no matter what its origin may have been, it tends to build up for itself a trade, and thus to maintain itself in prosperity, even though the circumstances in which it had its rise should quite pass away. Religious change is, as a rule, exceedingly slow, and towns which grew up at first for the convenience of pilgrims are often preserved in prosperity for many centuries by the conditions which gave them birth. In India we have illustrations of this in **Benares** and **Puri**. Puri exists solely for the sake of pilgrims, and though Benares has now an additional importance, due to other and more modern causes, yet its shrines and pilgrims are still the chief sources of its wealth.

175. Political changes are often as rapid as religious changes are slow, and though they may greatly reduce the importance of a town they seldom lead to its extinction. In most cases such towns possessed from the first, as we have seen, a certain suitability of position for trading purposes. When they became centres of government and seats of a large population roads were pushed out in every direction and other means of communication opened up, till in course of time they became the recognized emporia for large districts. When their political importance declined their trade still maintained them and became a more enduring cause of prosperity and wealth. In India, **Poona**, **Trichinopoly**, and a host of other towns are illustrations of this. When, however, such ancient military towns were not well situated for trade, and did not become the accepted commercial centres of considerable districts, political changes sometimes led to their complete extinction. **Kanauj**, **Ajodhya**, and **Seringapatam** are examples.

176. Religions. As religion is very largely the basis of social and political institutions, as well as the rule of individual conduct, it has always exerted a more powerful influence than anything else over the character and condition of communities,

and wherever a rapid advance in civilization has taken place it has been due more to an elevation of the religious ideas of the people than to any other single cause.

177. The history of the human race shows a steady advance from crude and material thoughts of God and man's relation to Him to purer and more spiritual ones. The religions of the savage races are based almost exclusively upon fear of evil spirits whom they seek to propitiate. Their worship is fetishism—the adoration of any natural object in which the evil spirit worshipped is supposed to dwell. A much higher stage than this is reached in polytheism—faith in many gods each of whom presides over some special branch of nature and is thus brought into direct contact with human life and so becomes an object of worship. Some of the greatest nations of antiquity were polytheists. From polytheism devout and earnest seekers after God have in all ages gradually passed to monotheism, and the different gods of the older faith have come to be regarded as diverse manifestations of the one Divine Power. But, apart from revelation, monotheism has generally tended to pantheism, or the doctrine that God is everything and everything is God. Pantheism is a subtle and philosophical monotheism which loses the Divine personality, and sometimes ends, as in the case of Buddhism, in practical atheism. The great monotheistic religions of the world—**Judaism, Christianity, and Muhammadanism**—teach that God is a Divine Person who has revealed Himself to man. Judaism is based upon the Old Testament, or the revelation made to the Jews. Christianity accepts the Old Testament but adds to it the New Testament, which, it holds, contains the fuller revelation of Himself which God made to man in Jesus Christ. Muhammadanism is based upon the **Korān of Muhammad**.

178. Neither Christianity nor Muhammadanism has any racial bounds, but each calls for the submission of the whole world. They are consequently essentially aggressive religions. Christianity is spreading in most parts of the world, and is rapidly replacing the more primitive faiths. At one time Muhammadanism made vast strides towards the subjugation of both Asia and Europe. In the latter, however, it has been set back both by the expulsion of the Moorish power from Spain and the decline of the Turkish Empire. At present the chief sphere of Muhammadan aggression is in Africa.

179. Hinduism is the religion developed by the chief branch of the Eastern Aryans who penetrated into India. It is based upon the Vedas and is, in essence, a philosophy combined with an abundant ceremonial and all-embracing caste-observances. But Hinduism has taken into itself almost everything which it found in Dravidian India. **Buddhism** had its origin in a revolt against Hinduism, and though it is not now very prevalent in the land of its birth, its followers are numerous in China, Indo-China, and Ceylon. **Confucianism**, nominally the state-religion of China, consists of little more than reverence for Confucius, "the holy man of old," and household ancestor-worship.

180. The number of disciples professing each of the great religions is approximately as follows:—Christians, 480 millions. Christianity is the religion of all the most advanced nations of the world. Jews, 8 millions. The Jews have no national organization, but are found in scattered communities. Muhammadans, 210 millions. Turkey is the head of the Islamic world, which recognizes the Sultān as Kaliph. Hindus, 210 millions, almost exclusively in India. Buddhists, probably not more than 110 millions. The number of Buddhists has been very variously estimated, some writers placing it as high as 350 millions. This has arisen through the inclusion of two-thirds of the population of China, but all authorities are now agreed that this is erroneous. Confucians, 150 millions.

181. Languages. These are divided into three great classes. **Monosyllabic** languages, like the Chinese, are made up of words of one syllable. Words may be joined but each remains distinct, as black-board. **Agglutinative** languages, like those of Southern India, are composed of words the parts of which do not join perfectly. One root remains distinct, but the others sink into mere terminations. **Inflectional** languages, like Sanskrit, Arabic, and English, the word-parts of which are so blended together that they seem all one piece.

182. The total number of languages in the world is estimated at about 4,000, but the great majority of these are spoken by only a mere handful of people. There are only eight that are used by over 40 millions of people each, viz.: Chinese, 400 millions; English, 130 millions; Russian, 100 millions; German, 64 millions; Hindi, 61 millions; Spanish, 48 millions; Bengali, 46 millions; and French, 45 millions.

POLITICAL AND GENERAL GEOGRAPHY

GENERAL DISTRIBUTION OF LAND AND WATER

183. The first thing that must strike anyone who examines a terrestrial globe is the fact that the greater part of the land is in the Northern Hemisphere. The entire surface of the earth is about 197 million square miles, of which about 55 million square miles are land and the rest water. Nearly three-fourths of the land is situated north of the equator. If we

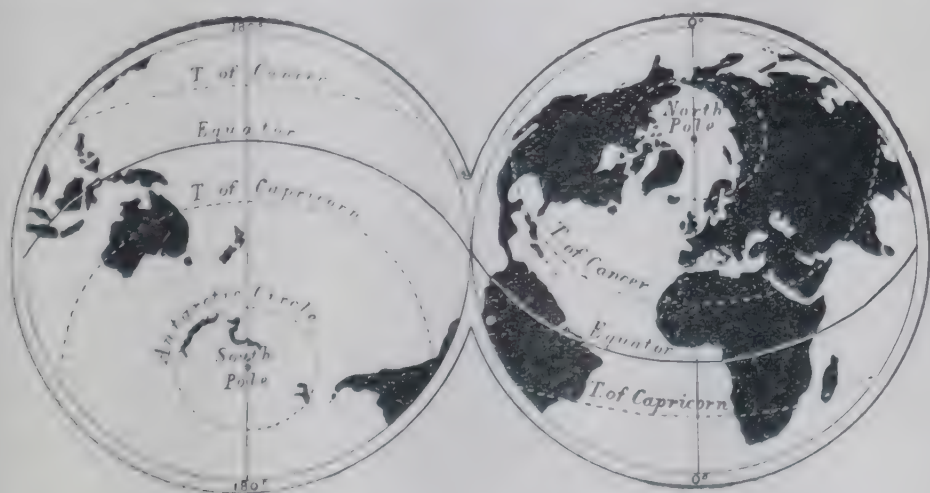


Fig. 54. The Land and Water Hemispheres.

divide the globe into two hemispheres of which the northern has its centre in Southern France instead of at the pole, the Southern Hemisphere will contain only about one-eleventh of the total land surface. The great bulk of the land is thus *on one side of the earth*. Closer examination will show us that in the neighbourhood of the Arctic Circle there

is an almost continuous stretch of land broken only by the Greenland Sea and a few narrow straits, and that at a similar distance from the South Pole there is an unbroken stretch of water. But the contrast goes further than this. The ring of land in the north encloses an arctic ocean, the immense depth of which has only recently been discovered, and the ring of unbroken ocean in the south is believed to enclose a vast ice-capped antarctic continent.

184. From the ring of land in the north three great tongues of land stretch southward extending in each case to about half-way between the Equator and the South Pole. Two of these are united north of the Tropic of Cancer, and form the vast land-mass of Eurasia. The other constitutes the New World of the Americas, which is now completely cut off from the Old World by water though it has not always been so.

185. The true contour of these three land-masses will be better understood if we imagine the level of the water surrounding them to be reduced. A reduction which would be slight in comparison with the great abysmal depths of the ocean would unite the Malay Archipelago and the island of Australia with Eastern Asia. It would abolish the Persian Gulf and the Gulf of Mexico, and would reduce the Mediterranean to a couple of inland seas of small dimensions. It would then be seen that one area of elevation in the lithosphere stretches from the northern circle to Cape Horn, and the other two, united in the north, to South Africa and Tasmania respectively. Between these three vast tongues of land stretch the three great oceans, the Atlantic, the Indian, and the Pacific; and as the land narrows towards the south, so, conversely, the oceans narrow towards the north.

186. Why the land and water should be thus arranged it is impossible to say. Many theories have been advanced, but at present we must be content to accept the fact without explanation. All we know is that the surface of the lithosphere shows four chief areas of depression, due doubtless to the shrinking of the interior, which form now the four great oceans, the Pacific, the Atlantic, the Indian and the Arctic; and that these depressions broaden in the south till they encircle the earth as a southern ocean, and narrow in the north till the encircling land is hardly broken.

187. Other resemblances, or contrasts, between the areas of depression and elevation should also be noticed. The shores of the Atlantic both east and west are low, and the general slope both of the Americas on the west and Europe and Africa on the east is towards the Atlantic basin. This ocean has therefore an unusually large drainage-area for its size. Exactly the opposite is true of the Pacific, both the eastern and western shores of which are rocky and precipitous. On the east the Rocky Mountains and the Andes run in an unbroken chain not far from the shore, and on the west the coasts of the continental land-mass of Asia descend with equal suddenness, and in some places, particularly east of Japan, the sea-bed sinks to abysmal depths within a hundred miles of the land.

188. It will be noticed, also, that almost all the great peninsulas stretch out in a southerly direction. Africa itself is a vast peninsula of the Old World land-mass, while the south of Asia is formed of the three peninsulas of Arabia, India and Indo-China. Smaller peninsulas stretching in the same direction are Kamchatka, Korea, Greece and Turkey, Italy, and Spain. In the New World, South America is a peninsula, and smaller peninsulas stretch to the south both east and west of North America.

189. The division of the land-surface of the globe into continents is somewhat arbitrary, but convenient. The one great natural division is between east and west—the Old World and the New. The continents of Europe, Asia, Africa and Australasia are, in reality, parts of one vast land-mass which have been separated by comparatively recent subsidences. Between Europe and Asia there is little true division and a close structural relation; and though Africa is more clearly separated from the rest of the mass it is nevertheless in many points structurally connected with it. One of the great lines of folding in the Old World stretches from the Atlas Mountains, in North Africa, through Asia to the east of Tibet. Similarly a vast depression, or crack, known as the Dead Sea Rift, stretches from Syria almost due south to 20° south of the Equator and brings into structural relation the Dead Sea and the great lakes of Africa. We shall nevertheless treat the continents in the usual way, beginning with the greatest.

ASIA

GENERAL VIEW

190. ASIA is by far the largest continent. From the most westerly point of Asia Minor to the Behring Straits, which separate Asia from America, it stretches through more than 160° of longitude, or a direct distance of 6,700 miles. The most northerly point, Cape Chelyuskin, is in 78° North latitude, while the most southerly point almost touches the Equator. Between these two is a distance, north to south, of 5,300 miles. If we take in the southern islands properly belonging to the great Asian land-mass, the continent crosses the Equator and stretches 9° south of it. The surface of Asia measures over 16 million square miles, an area equal to the two Americas, or, if the islands be added, it is very nearly $17\frac{1}{2}$ million square miles. The continent thus comprises almost one-third of the known land of the globe.

191. There are many points of general similarity between Europe and Asia, and the two continents are frequently treated as one under the title **Eurasia**. The dividing line between them north of the Caspian is a very poor natural boundary; indeed, except where it coincides with the low Ural range, it is hardly a natural boundary at all. Both continents are characterized by a great expanse of lowland in the north, gradually rising in the south to a central mountainous core. South of the great mountain-systems in both continents lie elevated plateaux, and further south each continent divides into three great peninsulas. The Iberian peninsula of Spain and Portugal, most of which is of considerable elevation, corresponds to the great peninsula of Arabia, which also forms a plateau of considerable height. Both peninsulas are also roughly rectangular in shape. Italy, with its southern island, corresponds less closely to India and Ceylon. The Balkan peninsula of Europe bears a striking likeness to the Indo-Chinese peninsula of Asia. Both are mountainous and to the south-east of each lie a multitude of rocky continental islands. The main mountain-systems of both continents, also, run east and west.

192. **Boundaries and Coast Line.** Beginning from the north-west corner, the **Ural Mountains** form the boundary between Asiatic and European Russia southward from the Kara Sea. The Urals are quite a low range, and decrease in altitude towards the north. Near the Arctic Ocean they bend round to the west and, dipping beneath the water, emerge again as the long island of **Nova Zembla**. Unfortunately for the north-western coasts of Siberia this island diverts the Gulf Stream Drift and leaves the Kara Sea and the Gulf of Obi under the full influence of the arctic cold. West of Nova Zembla the ports of Northern Europe are open for the greater part of the year, east of Nova Zembla they are closed by ice for at least nine months.

193. A little to the north of latitude 60° the boundary-line between Europe and Asia strikes the east of the Ural Mountains, then turning westward passes south of them, and bending southward again stretches to the northern point of the **Caspian Sea**. This part of the boundary is purely artificial. The Caspian Sea divides Europe and Asia for three-quarters of its length. Between the Caspian and the **Black Sea** the natural boundary would be the snowy line of the Caucasus range, but this range is politically in Europe as European Russia stretches south of it till it meets the northern limit of Persia. The boundary line in this region is again, therefore, a more or less artificial one, running from the southern part of the Caspian to the south of the Black Sea *via* **Mount Ararat**, where Russia, Persia, and Turkey meet. From that point the high tableland of **Asia Minor** stretches westward. The coast descends quickly to the Black Sea on the north and the Mediterranean on the south, but is much broken on the west, where it is fringed with the rocky islands of the **Ægean**. At the **Straits of Bosphorus** and the **Hellespont**, between which lies the **Sea of Marmora**, Asiatic and European Turkey come within a few miles of each other.

194. South-west of Asia Minor is the vast peninsula of **Arabia**, a high and rocky plateau. It is separated from Africa by the **Red Sea** but united with that continent in the north by the **Isthmus of Suez**, across which the Suez Canal has been cut. The Red Sea is a sea of great depth, and the rocky coasts of the peninsula descend sharply to the water. The same is the case all along the southern coast, which faces

the Arabian Sea. Exceedingly little rain falls in Arabia, and its coasts are not broken by a single stream. Between the Red Sea and the **Gulf of Aden** is the narrow strait of **Bab-el-Mandeb**, divided into two channels by the small island of **Perim**. Near the straits, on a small bay, is the British port of **Aden**, which commands the Red Sea route between Europe and Asia.

195. East of Arabia is the shallow **Persian Gulf** which separates Arabia from Persia. Into the gulf the great rivers Euphrates and Tigris, which unite near their mouth, discharge the drainage of Armenia and Mesopotamia. Their alluvial plain, once one of the richest plains in the world, stretches for nearly 800 miles in a north-westerly direction from the head of the gulf, and separates the plateaux of Arabia and Persia. Through the **Straits of Ormuz** the Persian Gulf communicates with the **Arabian Sea**, and the rocky coasts of **Persia** and **Balūchistān** run eastward to **Cape Monze**, the most westerly point of **India** proper.

196. The great peninsula of **India** stretches from this point as a triangular mass into the Indian Ocean. Its coasts have few indentations, or natural harbours, and consist for the most part of low stretches of sand and mud. The island of **Ceylon** is just severed from the mainland, and on its eastern side has a rocky coast sinking rapidly to great depths. The **Bay of Bengal** separates India from **Indo-China**, the third great peninsula of Asia, which stretches further south than either of the others. Save in the **Gulf of Martaban**, where the delta of the Irrawaddy is encroaching on the sea, its western coast is rocky and fringed with islands of which the largest are **Ramri** and **Cheduba** in the north.

197. From the southern point of Indo-China, called the **Malay Peninsula**, the general trend of the continental coast-line is in a north-easterly direction to the **Behring Straits**, but its vast stretch is broken by a series of indentations which are roughly similar in outline. West of the Malay Peninsula is the **Gulf of Siam**, confined on the eastern side by the peninsula of **Cambodia** and **Cochin China**. East of Cape Cambodia the coast of **Anam** runs almost in a semi-circle to the **Gulf of Tongking**, which is also confined by a peninsula stretching southward and continued in the island of **Hainan**. North-west of this point again the coast is roughly semi-circular till

the **Yellow Sea** is reached. This sea is continued into the land by the **Gulf of Pechili**, south-east of which is the great delta of the Hoang-ho or Yellow River. The Yellow Sea is confined by the peninsula of **Korea** which also stretches in a southerly direction. North-west of Korea the coast once more bends round in a rough semi-circle to the **Sea of Okhotsk** which, like all the rest of the China coastal seas, is bounded on the east by a peninsula stretching southward, that of **Kamchatka**, which separates the Sea of Okhotsk from the **Behring Sea**.

198. Throughout its whole length the east coast is fringed with islands which seem to hang around it in a succession of festoons. From Kamchatka the string of **Kurile Islands** stretches to within a few miles of the northern island of Japan, enclosing the **Sea of Okhotsk**. **Sakhalin** and the islands of **Japan** run almost in a semi-circle from the western part of the Sea of Okhotsk to the peninsula of Korea from which they are separated by the Korean Strait. They enclose the **Sea of Japan**. South of Japan a festoon of smaller islands, the **Luchu Islands**, take a similar curve to the north-east corner of the island of **Formosa** which approaches to within 100 miles of the mainland. They enclose the **East China Sea** of which the **Yellow Sea** is the north-western arm. From the south of **Formosa** a large loop is made by the **Philippines** and **Borneo** which enclose the **South China Sea**. The coasts of almost all the islands as well as of the mainland itself (except where the great rivers have their deltas) are rocky and outside the island-festoons the bed of the ocean sinks very rapidly, the deepest part of the Pacific being immediately to the east of Japan. Volcanoes and earthquakes are generally associated with such rapid dips, and accordingly we find an unbroken volcanic line running southwards along the line of islands to 10° south of the Equator.

199. North of the Behring Sea the **Behring Straits** unite the Pacific and Arctic Oceans. At one time Asia and America were probably joined by an isthmus, and even now the Strait is so shallow that the deep basins of the Pacific and Arctic Oceans are practically separated. The **Arctic Ocean** bounds the whole of Asia upon the north. The coast is low and flat but in most parts rocky and such soundings as have been made seem to show that the depth of the ocean increases rapidly. In the west the coast line is broken by numerous



Fig. 55. Asia in relief.

rocky fjords which stretch far inland. The entire coast, however, from Nova Zembla to the Behring Straits is closed by ice for the greater part of the year.

200. Surface. The **Pamir Plateau** to the north-east of Kashmir is the centre from which the great mountain systems of Asia radiate. The plateau itself is over 10,000 ft. in height and is crossed by ridges running from east to west, rising from 3,000 to 5,000 ft. above the level of the plateau itself. From this centre the **Hindu Kush** strikes in a west-south-west direction and bending round to the west forms the beginning of a range which runs, with few breaks, along the north of Persia and south of the Caspian into the **Armenian Highlands**. Due southward from the Hindu Kush run the **Sulaimāns** forming the western boundary of India proper, and gradually bending westward at lower elevations form the **Southern Persian chain**, which, bending northward and bounding the basin of the Tigris on the east, merges, like the northern range, into the Armenian Highlands. Further west the two ranges diverge again and form the northern and southern buttresses of the **Plateau of Asia Minor**. In the east these ranges enclose the **Iranian Plateau** which varies in height from 2,000 to 4,000 ft. and contains the basin of the **Helmand**, an area of inland drainage.

201. From the eastern side of the Pamir Plateau run numerous ranges of great elevation. The chief of these are the **Himālayas** which form the southern buttress of the great Plateau of Tibet, and the **Kuen-lun** and **Altyn Tagh** ranges which form its northern buttresses. The vast mass of highlands which these ranges enclose has no equal in the whole world. Over an area of half a million square miles the level never drops below 12,000 ft. From the eastern point of the plateau the northern ranges gradually bend more to the north and are continued in the **Khingan** and **Stanovoi Mountains**. From the northern point of the Pamir plateau the **Tian Shan Mountains** run in a north-easterly direction till they almost meet the **Altai range** which stretches from the north-west. These ranges are continued to the north-east in the **Yablonoi Mountains**.

202. Between the Tian Shan Mountains and the Altyn Tagh, and stretching north-eastwards between the Yablonoi and the Khingan ranges is a vast area which was once an inland-

sea. The western portion forms the **Tarim Basin** and the eastern is the **Desert of Gobi**. This vast plain is now about 3,000 ft. above sea-level. It has an area of over 700,000 square miles, and is, for the most part, dry and barren. To the north of this ancient sea-bed lies the more elevated plateau of **Mongolia**, of which the **Altai Mountains** form the western backbone. The general slope of these highlands is to the north and west. They maintain an altitude of from 5,000 to 3,000 ft. for a width varying from 100 miles in the west, where they are highest, to 2,000 ft. in the east, and on their northern side fall abruptly to the **Siberian plains**. The **Yablonoï** and **Stanovoi Mountains** converge west of the Sea of Okhotsk, and are continued in hills of lower elevation to the north-east corner of the continent.

203. In the east of the Tibetan plateau the mountain-folds gradually bend southwards and are continued in parallel ranges through the Indo-Chinese peninsula. The most westerly of the folds runs along the coast of Burma as the **Arakan Yoma** to **Cape Negrais** and re-appears in the **Andamans** and **Sumatra**. Another, the **Poung-Loung Yoma**, separates the basin of the Irrawaddy from that of the Salwin. A third, the **Tenasserim Yoma**, bounds the Salwin basin on the east and continues almost unbroken to the southernmost point of the Malay peninsula, while the fourth separates the upper basin of the Mekong from that of the Yang-tse, and running in a southward direction defines the coast line of Anam.

204. **Drainage.** From the great Central Asian highlands all the chief rivers of the continent flow. The **Indus**, the **Ganges**, and the **Brahmaputra** take the drainage of the Himālayas north and south into the Arabian Sea and the Bay of Bengal. The **Irrawaddy**, the **Salwin**, the **Yang-tse Kiang** and the **Hoang-ho** all flow from the east of the plateau, the three first-named reaching the sea through the Indo-Chinese peninsula, and the two latter forming the great rivers of central China. From the highlands north of the Tarim and Gobi depression, the **Obi**, with its tributary the **Irtish**, the **Yenisei**, and the **Lena** all flow northward into the Arctic Ocean, while the **Amur** flows eastward into the Sea of Okhotsk. The **Euphrates** and the **Tigris** both take their rise in the Armenian plateau and take a parallel course to the Persian Gulf.

205. There are also considerable areas of inland drainage. The **Amu Daria**, or **Oxus**, and the **Syr Daria**, or **Jaxartes**, flow into Lake Aral, the **Ili** into Lake Balkash, and the **Tarim** into Lob Nor. These three lakes, having no rivers flowing from them are all salt. **Lake Baikal**, west of the Yablonoi Mountains, formed by a deep crack in the crystalline rocks, receives the drainage of the surrounding hills, but being itself drained by the **Angara**, a tributary of the Yenisei, it remains fresh and sweet. It is one of the largest fresh-water lakes in the world, being 450 miles in length. Numerous small salt lakes in the higher plateaux receive the local drainage, and the **Helmand** which flows through Afghānistān loses itself in an inland salt-swamp near the boundary-line between Afghānistān and Persia. In Arabia there are no rivers at all. A region which is almost rainless extends from the Sahara through Arabia to the Desert of Gobi.

206. The average height of the land of Asia exceeds that of any other continent, but it includes nevertheless one of the most extensive low-lying plains in the world. The mountains that bound the Iranian plateau on the north fall rapidly on their northern side to a region of inland drainage to the Aral and Caspian. This is known as the **Turan depression**. From this region an unbroken plain runs northward to the Arctic Ocean, forming the eastern section of the vast lowlands of Eurasia, which are divided into two parts by the low Ural range. A similar plain, but gradually increasing in elevation towards the east, extends along almost the whole of northern Siberia. The entire plain north of the Aral and Caspian once formed a great arm of the Arctic Ocean, and the ancient seabed is now drained by tributaries of the Irtish.

207. **Climate and Rainfall.** South-eastern Asia is hot and moist, south-western hot and dry. The centre of the continent is hot in summer but cold in winter, while the north is always cold and in winter extremely so.

Owing to the enormous size of the Asian land mass the greater part of its area is far from the moderating influences of the sea, and the climate of the interior alternates between intense heat and severe cold. The vast Hīmalāyan Mountains and their extensions, moreover, interpose an effectual barrier to the currents which drift from the southern oceans during the S.W. monsoon. Central Asia, therefore, does not get

the benefit of the warmth and moisture of these southerly winds. No similar range, however, acts as a barrier to the cold winds from the north, which are dry and biting and blow over central Asia for more than half the year. In the interior of the continent the rainfall is, in consequence, extremely scanty.

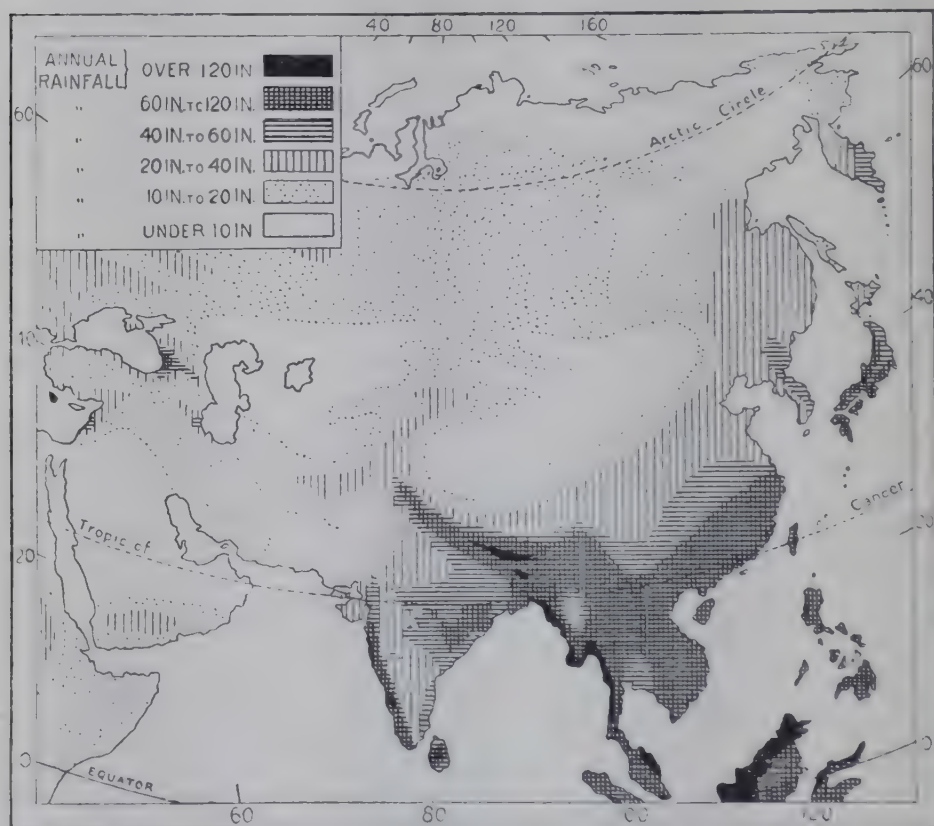


Fig. 56 Average Annual Rainfall of Asia.

Greater extremes of temperature are found in Asia than in any other part of the world. Just upon the Arctic Circle, and in longitude about 120° E., there is an area that experiences a winter cold unknown in the Arctic regions. This part of Asia has the enormous range of 120° F., falling in winter to -50° F. and rising in the summer to 70° F. Around this central node of extreme winter cold the January isotherms run at almost equal distances. It will be seen from the map that the White Sea in the same latitude has a temperature 60° F. warmer.

208. It should not be forgotten, however, that it is to the extreme dryness of central and western Asia, and the vast contrasts between their summer and winter temperatures, that the southern and eastern portions of the continent owe the generous watering they annually receive. For it is the great increase of central Asian temperature in the summer, and the

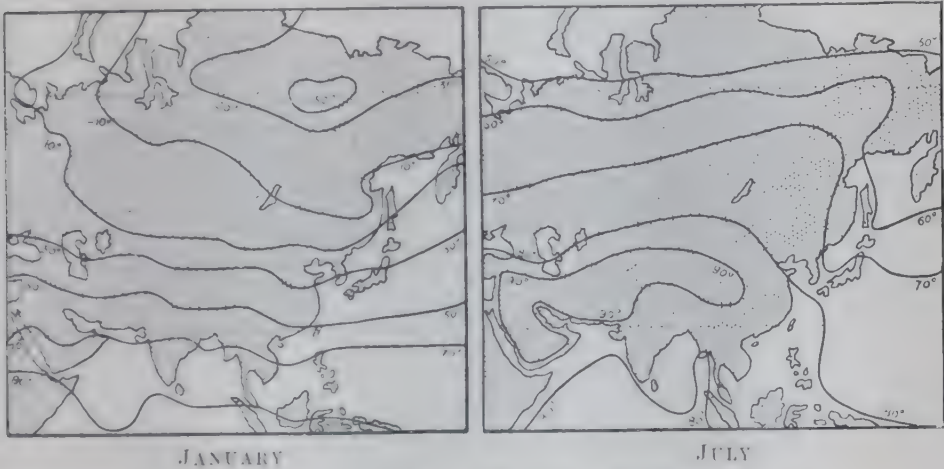


Fig. 57. Showing the Winter and Summer Isotherms.

corresponding decrease in the winter, that give rise to the monsoons, upon which the fertility of the south and east so largely depends.

209. **Political Divisions.** The following table shows the chief countries of Asia, their area and population :—

Country	Square miles	Population
Asiatic Russia	6,221,000	19,200,000
Chinese Empire	4,277,000	433,500,000
Indian Empire	1,773,000	294,400,000
Arabia	1,200,000	6,000,000
Asiatic Turkey	700,000	22,000,000
Persia	628,000	9,500,000
Afghānistān	250,000	4,500,000
Siam	244,000	5,000,000
French Indo-China ..	256,000	17,700,000
Japan (including Formosa)	161,000	17,800,000
Ceylon	24,000	3,600,000



Fig. 58. India in relief.

INDIA

GENERAL VIEW

210. The natural boundaries of India proper are exceedingly well defined. The peninsula is separated from Arabia by the Arabian Sea, and from Indo-China by the Bay of Bengal.

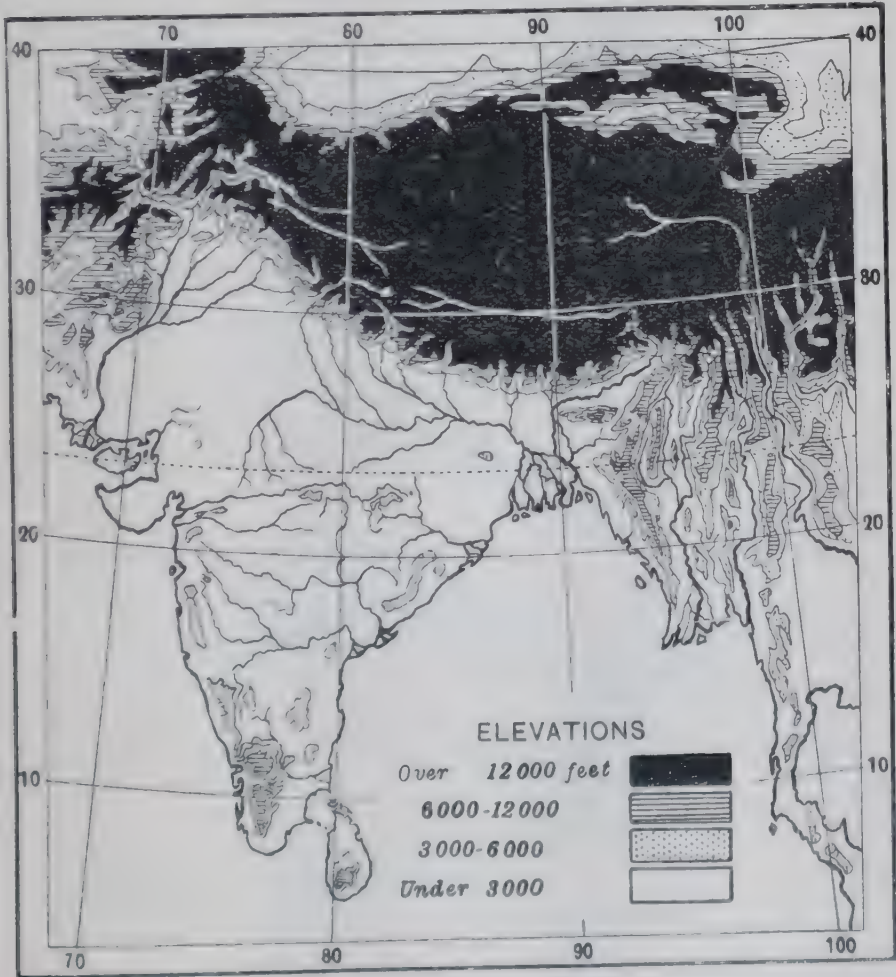


Fig. 59. The Mountain Barriers of India, and the great Plateau of Tibet.

In the north the **Himālayas** form an almost impassable barrier for 1500 miles. On the north west and on the north east are regions of more broken, mountainous country stretching from the extremities of the Himālayan wall to the sea. No other

country, of equal extent, not being an island, is so completely isolated, or forms so true a geographical unity. The **Empire of India** includes **Burma** on the east and **Balūchistān** on the west, both of which lie beyond the boundaries of India proper.

211. India is divided by nature into three separate regions. In the north is the **region of mountains**, the vast Himālayan ranges with their allied systems. Immediately to the south is the equally vast **region of plains**. To the south again is the **region of plateaux**, which includes almost the whole of peninsular India. To these three well-defined regions of India proper, we must now, if we speak of the Empire of India, add a fourth, viz. **Burma**, a region of alternate mountain ranges and valleys, with the delta of the Irrawaddy in the south.

212. The Himālayan Region. The vast system of highlands of which the Himālayas form the southern wall extends from the **Pamīr Plateau**, which lies to the north-west of Kashmīr, to the bend of the Brahmaputrā in the east. From the Pamirs the **Hindu Kush** range runs in a south-westerly direction into

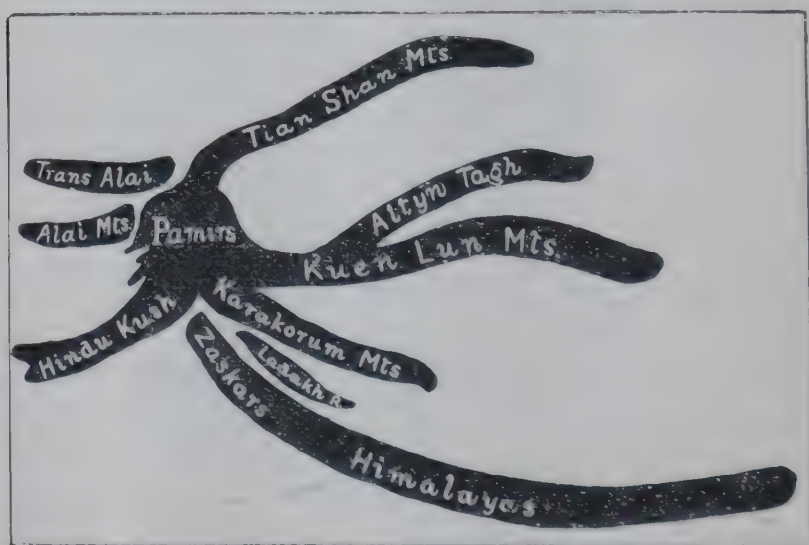


Fig. 60. Showing the Ranges radiating from the Pamirs.

Afghānistān. From the same centre the **Mustagh** or **Kārā-korum Mountains**, a range of great and sustained height, culminating in **Mt. Godwin Austen**, 28,265 ft., branch off in a S.E. direction. To the south of this range, and running at first almost parallel with it, is the western portion of the **Himālayas** proper, sometimes called the **Zaskars**. The river Indus,

rising in Tibet, flows in a north-westerly direction between the Kārākorum and Himālaya ranges, and then bending sharply to the south-west, divides the western extremity of the Himālayas from the spurs of the Hindu Kush. From this point the Himālayas run first in a south-easterly direction, and then gradually bend round to the east. The Brahmaputra rises near the Indus, north of the main range, and after flowing in an easterly direction for over 800 miles, rounds the eastern extremity of the Himālayas just as the Indus rounds the western. The length of the range is about 1,500 miles, and its width from 150 to 200 miles.

213. The most westerly peak of the Himālayas proper is **Nanga Parbat**, which lies just within the angle of the Indus and rises to a height of 26,620 feet. **Nanda Devi** (25,600) is in Kumaun, south of the source of the Indus. To the west are **Dhaulāgiri** (26,826), **Gosai Than** (26,300), **Everest**, or **Gaurisankar**, (29,140) the highest mountain in the world, **Kinchinjunga** (28,176) and **Chamalhari** (23,929). The Himālayas are, however, only the southern wall of the great **Plateau of Tibet**.

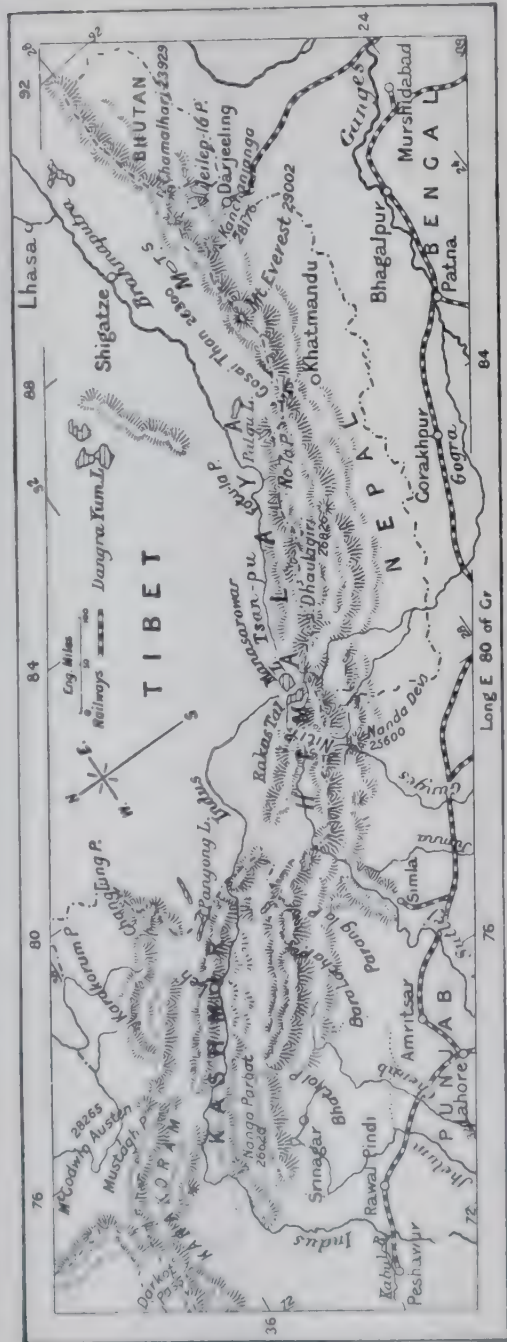


Fig. 61. The Himālayas.

Branching from the northern side

of the Kārākorum Range are the **Kuen Lun** and the **Altyn Tagh Mountains**, which run at first due east, then bend slightly to the north, and further east to the south again. These form the northern boundary of the plateau. Between them and the Himālayas the elevation nowhere falls below 12,000 feet. The length of the plateau from east to west is 1,600 miles, and its width from north to south varies from 200 to 600 miles.

214. From the Pamīr Plateau the **Hindu Kush** runs in a south-westerly direction. Branching from the Hindu Kush the short but lofty **Safed Koh** range runs in an easterly direction south of the Kābul river. From this range rugged and broken extensions stretch south as far as the river Gomāl. South of the Gomāl are the **Sulaimān Mountains** running north and south, of lower elevation but culminating in the north in the lofty peak of **Takht-i-Sulaimān**, over 11,000 feet high. Towards the south the folds of the Sulaimāns open out and, in steadily decreasing altitudes, bend round to the west. These various mountain ranges form the natural **north-west frontier** of India proper.

215. Across this frontier, which extends for nearly 850 miles, numerous **passes** over the mountains provide gateways between India and the countries to the N.W. and W. The **Malakand Pass** in the east of Chitrāl, and the **Barogil** and **Dorah passes** over the Hindu Kush, all give communication between India and Central Asia. The **Khaibar Pass** crosses the eastern spurs of the Safed Koh, twenty-five miles west of Peshāwar, on the road which leads from Peshāwar to Kābul *via* the valley of the Kuram river. The **Tochi Pass** is on the road from Bannu to Ghaznī which follows the valley of the Tochi. The **Gomāl Pass** is 30 miles north of Takht-i-Sulaimān on the road passing up the valley of the Gomāl to the Plateau of Afghānistān. The **Bolān Pass**, which lies to the west of the southern Sulaimāns, is now traversed by a railway which connects Quetta with India.

216. South of the great mountain wall lies the **great plain** of the Indus and the Ganges which stretches without a break from the Arabian Sea to the Bay of Bengal, and in width varies from 100 to 300 miles. The plain is entirely alluvial, being formed of the silt brought down by the great rivers which traverse it. The northern and eastern portions form

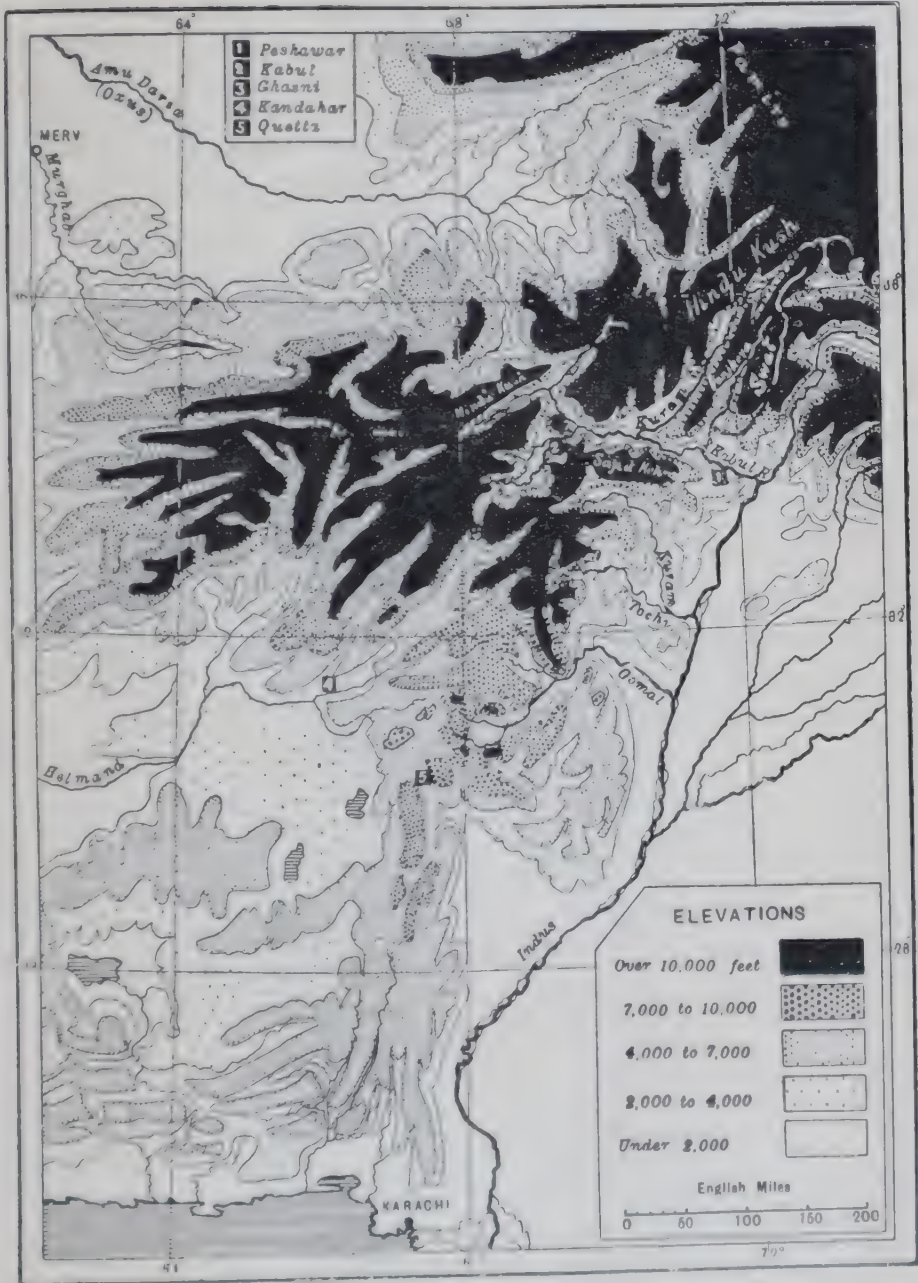


Fig. 62. The North-Western Frontier Mountains from the Arabian Sea to the Pamirs.

the most fertile and populous part of India. In the west a large part of the plain—that lying south-east of the Indus and at a little distance from the river—is comparatively barren. The soil is sandy and the rainfall scanty

217. **Peninsular India.** South of the Indo-Gangetic Plain a belt of highlands runs right across India, separating the northern plains from the plateau of the Deccan. From the Gulf of Cambay the **Vindhya**s, a low range, run almost due east. To the south of the Vindhya, and separated from them by the beautiful valley of the Narbadā, are the **Sātpurās** a range of much higher hills. North-west of the Vindhya, the **Arāvallis**, a low range, stretch northwards into the plain. East of the Sātpurās and Vindhya, the **Gāwilgarh Range**, the **Mahādeo Hills**, the **Maikal Range**, and the Hills of Chotā Nāgpur, continue the belt of highlands right across the peninsula to the plains of Bengal. South of this belt lies the great **plateau of the Deccan**, which constitutes the central core of the peninsula.

218. Except where broken in the east by the great rivers, this plateau maintains an elevation of from 1,500 to over 3,000 feet. It is bounded on the west by the **Western Ghāts**, or **Sahyadri Mountains**, which increase in elevation towards the south, till in the **Nīlgiris** and **Anamalais** they reach 8,000 feet. The eastern boundary of the plateau is a broken range of highlands commonly called the **Eastern Ghāts**, stretching southwards from the hills of Orissa till their southernmost spurs, the **Shevaroy Hills**, almost meet the eastern spurs of the Nīlgiris. The Eastern Ghāts are much lower than the Western Ghāts, seldom exceeding 3,000 ft., and are separated from the sea by a much broader alluvial plain.

THE GREAT RIVERS

219. The **Indus**, the **Brahmaputra**, and the **Ganges**, drain the main slopes of the Himālayas, both north and south. The Indus and Brahmaputra bring the drainage of the north round the western and eastern extremities of the mountain chain, and make their way through deep gorges between the mountains. The **Indus**, its main tributary the **Sutlej**, the **Brahmaputra**, and the **Gogra**, one of the chief tributaries of the Ganges, rise within 100 miles of each other, near **Lake Mānasarowar** in Tibet, at an elevation of over 16,000 ft. The **Ganges** and the **Jumna** rise in the mountains about 100 miles west of this lake.

220. The **Indus** rises in Tibet and flows for 800 miles in a north-westerly direction, then, rounding the western extremity of the **Himālayas**, takes a south-westerly course to the Arabian Sea. From the west it receives the waters of the **Gilgit**, the **Kābul** river, the **Kuram**, and the **Gomal**. But the greater affluents of the Indus are from the east. They are five in number, and, watering the Punjab, give that province its name—*panj-ab*, five waters. The **Jhelum** is the most westerly, and pours its waters into the **Chenāb**, which, further down, also receives the waters of the **Rāvi**. The **Sutlej**, the



Fig. 63 The Indus and its tributaries.

most westerly of the five rivers, flows from **Rākās Tāl**, a lake in Tibet, and, breaking through the gorge in the **Himālayas** north of **Simla**, enters the Punjab from the east. When half way on its course to the Indus it is joined by the **Beās**, and 300 miles further down unites with the **Chenāb**. One channel, called the **Panjnād**, thus carries the water of all five rivers to the Indus. All these rivers being fed by the melting snows as well as by the monsoon rains are in flood in the late summer.

221. From its confluence with the **Panjnād** the Indus flows midway between the frontier hills of **Balūchistān** and

the Thar, or Indian Desert. It has, therefore, no further affluents of importance, and, in the lower part of its course gives more water than it receives. At Sukkur it narrows into a rocky channel and is spanned by a great railway bridge. Two hundred miles further south the delta begins, and the river pours its waters into the Arabian Sea.

222. The **Brahmaputra** rises north of the Himālayas, and flows almost due east for a distance of 700 miles. It then bends sharply round the mountains and takes an almost westerly course through the narrow valley of Assam. West of the Khāsis it turns south and almost immediately begins to throw off distributaries, and its waters, joining those of the Ganges, are discharged into the Bay of Bengal.



Fig. 64. The Ganges and Brahmaputra.

223. The **Ganges** proper is formed in Garhwāl by the union of two rivers, the **Bhāgirathi**, which rises among the glaciers of Gangotri, and the **Alaknanda**, which rises to the north-west of the great peak of Nanda Devi and breaks through the Garhwāl Himālayas. The river thus formed flows for 50 miles in a south-westerly direction, and then gradually bends round to the south and south-east. On its eastern side it receives many tributaries, the chief of which is the **Rāmganga**, which also rises in Garhwāl. From the west and south it receives no tributary of importance till it reaches Allahābād, where it is joined by the **Jumna**.

224. The **Jumna** also takes its rise north of Garhwāl and west of the Bhāgīrathī. In its course it describes a curve similar to that of the Ganges, and at a distance of from 50 to 80 miles west of that river. Unlike the Ganges, however, its main affluents are from the west and south. The most important of these is the **Chambal**, the numerous tributaries of which drain the eastern slopes of the Arāvallis and the northern slopes of the Vindhya.

225. From Allahābād the Ganges flows eastward, and is presently joined by the **Gumti**, which descends from the frontiers of Nepāl and the **Gogra**, which rises near Lake Rākas Tāl, and breaks through a gorge in the mountains. On its way the Gogra receives the waters of the **Sarda** and the **Rapti**. Within the next 30 miles the Ganges is joined by the **Sōn** from the south and the **Gandak** from the north, and when north of the Rājmahāl Hills it receives the **Kūsi** from the north. Both the Gandak and the Kūsi rise north of the Himālayas and break through the mountain chain, while numerous feeders of the Sōn drain the rocky highlands of the Central Provinces and Chotā Nāgpur. After passing the Rājmahāl Hills the Ganges bends toward the south-east, and soon begins to throw off its distributaries. The first of these is the **Bhāgīrathī**, which lower down becomes the **Hooghly**. The main stream still continues in a south-easterly direction till south of Pabna, it divides into two almost equal streams, one of which, the **Madhumati** (or **Haringata**) takes a southerly course to the sea, and the other, the **Pudda** (or **Padma**) follows a more easterly course to Goālānda, where it unites with the Brahmaputra.

226. **The Rivers of the Peninsula.** Most of the great rivers of the peninsula pour their waters into the Bay of Bengal. The only exceptions of any moment are the **Narbadā** and the **Tāpti**, both of which discharge into the Gulf of Cambay. The Narbadā, rising near Mount Amarkantak in the north of the Central Provinces flows almost due west. It receives few tributaries and no large ones. The Tāpti rises east of the Gāwīgarh range of hills, and empties itself into the Gulf of Cambay a little to the north of the ancient port of Surat. The four great rivers that discharge into the Bay of Bengal are the **Mahānadi**, the **Godāvāri**, the **Kistna** and the **Cauvery**. Together they drain fully three-quarters of Peninsular India.

227. The basin of the **Mahānadī** meets that of the **Narbadā**, and one of its chief tributaries takes its rise, like that river, on the slopes of Mount Amarkantak. The **Mahānadī** itself rises further south. It flows at first in a northerly direction till, having received its chief tributary, the **Seonāth**, it turns to the east and flows past Sambalpur. The **Mahānadī** breaks through the hills by a gorge of great beauty 40 miles long, and, after passing Cuttack, divides into the numerous channels of its delta.

228. The **Godāvari** rises in the Western Ghāts a little north of Bombay. Its main tributary on the south is the **Mānjira**.

From the north it receives the **Pranhita**, formed by the union of the **Paingangā** from the west, the **Wardhā** from the north-west, and the **Waingangā** from the north. Further on it receives the **Indrāvati**. In their passage through the Ghāts the waters of the **Godāvari** are confined for twenty miles within a deep and narrow channel, and the scenery on both sides is wild and grand. At **Dowlaishwaram**, the apex of its delta, the river divides into three main distributaries and many smaller ones, and so reaches the sea.



Fig. 65. Rivers of the Peninsula.

229. The **Kistna** receives the eastern drainage of more than one half of the Western Ghāts. It rises near Mahābal-eshwar. It has two great tributaries, the **Bhima** which rises in the north of Poona, and the **Tungabhadra** which is formed by the union of the **Tunga** and the **Bhadra**, both of which rise in the west of the Mysore State. The **Kistna** delta is immediately to the south of that of the **Godāvari**.

230. The **Cauvery** and its tributaries drain the whole of southern Mysore, the eastern slopes of the Nilgiris and Anamalais, and the northern and eastern slopes of the Palnis. After passing Trichinopoly its delta begins. The river divides into two arms, the smaller of which, still called the **Cauvery**, flows almost due east, and divides again into several channels before it reaches the sea. The larger, called the **Coleroon**, flows in a north-easterly direction, and empties itself into the sea half way between Pondicherry and Negapatam.

231. **Rivers of Burma.** The **Irrawaddy** drains the greater part of Burma. It is a noble river, navigable by light draught steamers as far as Bhamo, 700 miles from the sea. The Irrawaddy rises in the mountains east of the bend of the Brahmaputra, and its general course is almost due south. A little below Mandalay it is joined by the **Myit-nge**, and the **Chindwin**. More than 100 miles from the sea the delta begins, and the river finds its way to the Gulf of Martaban through fourteen channels. On the most easterly of these stands the port of Rangoon.

232. The **Salwin** rises amid the snows of Tibet. Bending to the south 200 miles east of the Brahmaputra, it makes its long journey to the Gulf of Martaban confined between ranges of hills which in the north narrow its basin to a few miles. Throughout its whole course it has a rocky bed. At seasons of flood the Salwin brings down more water than the Irrawaddy. But rocky rapids make navigation impossible for more than 100 miles from its mouth. The **Sittang** is a comparatively short river between the Irrawaddy and the Salwin which also discharges into the Gulf of Martaban. It drains a rich and fertile valley, but sandbanks at its mouth and a severe tidal bore hinder navigation.

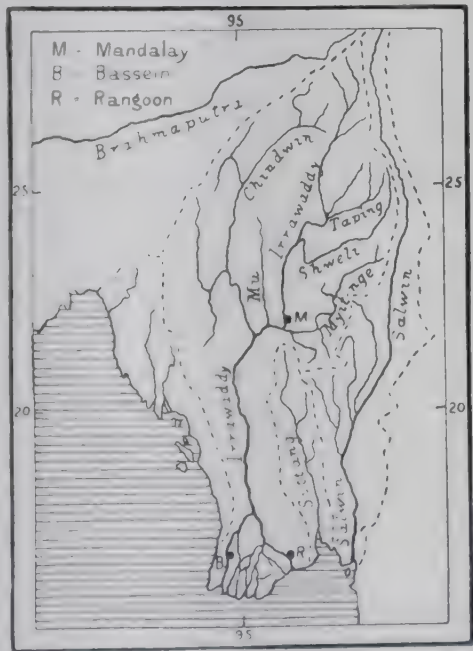


Fig. 66. Rivers of Burma.

COAST LINE, HARBOURS, AND ISLANDS

233. The coast line of India is comparatively uniform and regular, and is broken by few indentations of any magnitude. For the greater part of its length a sandy and almost level coast strip is washed by shallow seas. In natural harbours India is unusually poor. Vast stretches of coast present no convenience or shelter whatever for shipping, neither land-locked bays nor navigable estuaries. The mouths of most of its rivers are blocked by sand bars which only boats of shallow draught can pass. At many of the smaller ports vessels have to anchor some miles from the shore. India could therefore never become a great maritime country. On the west coast of the peninsula the only harbours that offer a safe anchorage in bad weather are **Karāchi**, **Bombay**, **Goa**, and **Kārwār**. The first three are growing ports, but Kārwār is declining. Three ancient ports on the Gulf of Cambay—**Cambay**, **Broach**, and **Surat**—are declining, as the Gulf is gradually silting up and access becoming more and more difficult. The other places at which steamers call along this coast are “fair weather ports” only. On the east coast there is not a single natural harbour of any kind or any place of refuge for shipping. Vast breakwaters have been constructed at **Madras** which are of service in comparatively fine weather, but worse than useless in a cyclone. Of the many distributaries of the Ganges and Brahmaputra only the **Hooghly**, the **Mutla** and the **Meghnā** are navigable for vessels of fair size. Calcutta is on the first of these, and in spite of the fact that the navigation of the river is difficult and dangerous Calcutta has long been, and seems likely to continue, the premier port of India.

234. The eastern shores of the Bay of Bengal are for the most part rocky, and there are consequently numerous natural harbours along the coast. The rivers also are more easily kept open. **Chittagong**, **Akyab**, **Bassein**, **Rangoon**, and **Moulmein** are all excellent ports. So are **Amherst**, **Tavoy** and **Mergui** on the Tenasserim coast. The island of Ceylon also has some excellent harbours. That of **Colombo** is due more to art than to nature, but **Galle Bay** and **Trincomallee Bay** are good natural harbours. Colombo is now the most important port-of-call in Asia.

235. Islands. With the exception of **Ceylon**, which does not belong to the Indian Empire, the islands of India are of little moment. They are, however, exceedingly numerous, especially off the coast of Burma and though small their united coast line exceeds 3,000 miles in length.

236. Salsette and **Bombay** are now connected with the mainland by a causeway, and can hardly be considered islands. **Elephanta** and **Trombay** are within the harbour of Bombay. Other smaller islands, mostly composed of volcanic rock, belong to the same group. The **Laccadives** and **Maldives** are coral islands. The Laccadives are about 200 miles west of the Malabar Coast, and belong to India. The Maldives are 300 miles south-west of Cape Comorin, and are under a Sultān tributary to Ceylon. **Rāmeswaram** and **Manār** are two islands lying between Ceylon and India, the former belongs to India the latter to Ceylon. Rāmeswaram is a noted place of Hindu pilgrimage. Of the many low islands at the mouths of the Ganges, Brahmaputra, and Meghnā, which are really parts of the delta, the chief are **Saugor** island in the west, and **Shabazpur** and **Sandip** islands in the east.

237. The islands off the Burmese coast are mostly rocky and volcanic in their origin. North of Cape Negrais the only islands of any moment, among the many hundreds with which the coast is studded, are **Barongo** and **Savage Island** which protect the port of Akyab, and the larger islands of **Ramri** and **Cheduba** a little further to the south. From Cape Negrais a well-defined submarine ridge runs southwards to Sumatra. About 75 miles south of the cape it crops up in the **Preparis Isles**, a group of minute volcanic peaks. Fifty miles further south are the **Coco Islands**, similar in every way except that they contain a minute volcano which is still very slightly active. Thirty-five miles south of the Cocos the **Andaman Islands** begin, a beautiful and in many ways important group, consisting of four large islands and many small ones, and stretching from north to south for a distance of over 200 miles. Further south again are the **Nicobars**. The Andamans and the Nicobars constitute a Chief-Commissionarship. They have many excellent natural harbours, well protected and with good anchorages. The same is also true of the **Mergui Archipelago**, which consists of many hundreds of rocky islands skirting the whole length of the Tenasserim coast.

CLIMATE AND RAINFALL

238. India extends through nearly 30 degrees of latitude, its southern point being almost on the equator while its northern part stretches into the temperate zone. It has vast well-watered lowlands, sandy deserts, arid plateaux and lofty mountain-slopes, and four-fifths of its area is far removed from the moderating influences of the sea. It consequently includes almost every variety of climate to be found in the world. But its great out-standing feature is the annual recurrence of the *monsoons*, upon which the prosperity and welfare of the whole country depend.

239. **The Monsoons.** In the winter months, owing to the dry cold which prevails over the uplands of Central Asia, a vast *high-pressure system* is generated which extends almost

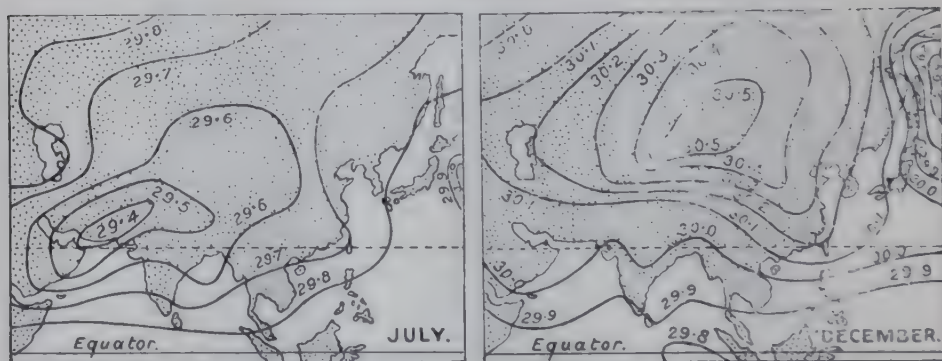


Fig. 67. Showing the *isobars* (or lines of equal barometric pressure) in July and December, when the S.W. and N.E. monsoons are fully established.

from the Caspian to the plains of China. During this period the prevailing winds in India blow from the north-east. These are the normal winds of that latitude and correspond to the trade-winds of the larger oceans. They are diverted from their normal course in many parts by the influence of mountain-chains, and in the valley of the Ganges they blow down from the north-west. But as a whole the air-currents over India during this season are from the cold plateaux of Central Asia to the southern oceans, and are cool and dry.

240. When the sun comes north these conditions are reversed. The rocky highlands are quickly heated and a vast

and deep low-pressure system is formed, having its centre over North-Western India. This draws the winds up from the south. By the end of April southern winds have commenced in many parts of India, and by the middle of June the south-west monsoon is blowing in full force from Cape Comorin to the Himālayas and over the whole of Burma. Like the north-

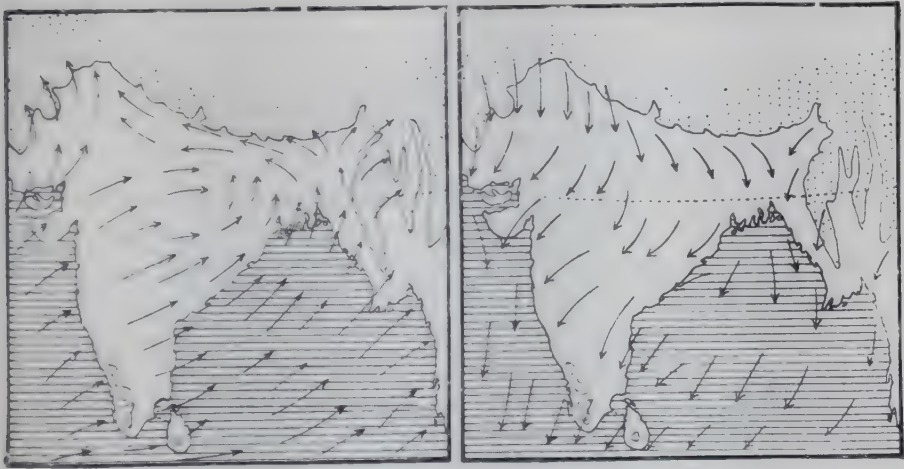


Fig. 68. Showing the general direction of the winds in India in the S.W. and N.E. Monsoons.

western winds these are in many parts diverted by the mountains. In the north of the Bay of Bengal they bend gradually round to the north and north west, and over the whole of the northern plain they blow from the south-east.

241. The south-west monsoon brings to India the greater part of the rain it receives. The warm, southerly winds come laden with moisture, and striking the Western Ghāts give a very abundant rainfall to this chain of hills and the western coastal plain. Over this area the rains continue with little intermission during the months of May, June and July. At the other side of the Ghāts, and over the eastern half of the peninsula, the fall is only slight, but it rapidly increases again when the current reaches the cool belt of highlands north of the Deccan. Over the hot plains of Sind and Rājputāna the winds pass without parting with any of their moisture, which they reserve for the North-Western Himālayas. Further west, Balūchistan lies almost outside the monsoon-area.

242. To the south and west of Ceylon the monsoon gives heavy rains, and then, sweeping across the Bay of Bengal, gives an equally copious watering to almost the whole of Burma. Towards the north the hills bend the current round to the west, and the heaviest downpour of all is given to the **Khāsi hills**, north-east of the great delta, where **Cherrapunji** receives an average of 600 inches a year. The current then

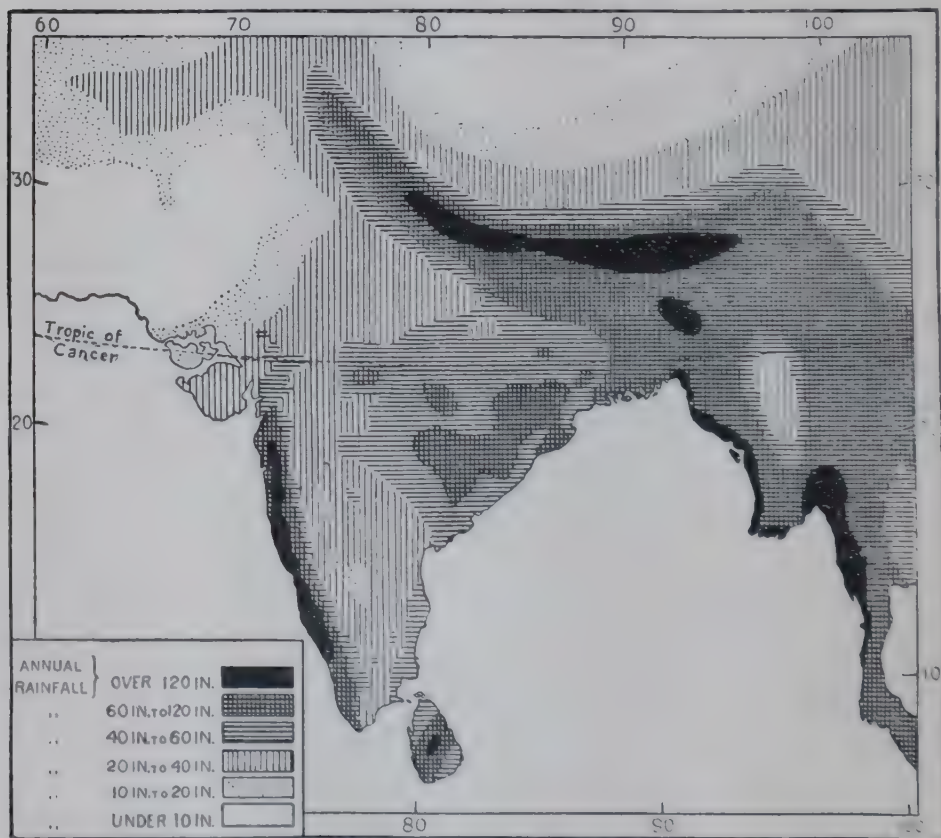


Fig. 69.- Average Annual Rainfall of India.

divides. One branch passes north-eastwards up the valley of the Brahmaputra, watering Assam, and the other north-westwards up the valley of the Ganges. The rainfall is heavy over the whole of the eastern portion of the Gangetic plain, but gradually diminishes to the west and south. It is naturally heaviest along the mountain slopes. The south-west currents do not cross the Himālayas at all, or at least they take

none of their water with them. Hardly any rain falls at this season of the year on the northern slopes of the mountains, and Tibet remains dry and arid.

243. By the end of July the south-west rains have almost ceased all over India, and as the autumn advances the conditions as to pressure change once more and N.E. winds begin. These are dry winds, for they blow from a dry area. In themselves, therefore, they would bring no rain to any part of India. But in the east of the Bay of Bengal the wet southerly current is still drifting northward. The new conditions as to pressure make it bend round to the west at the head of the bay, and, being caught and chilled by the cold N.E. winds, it is driven along the east coast of India and Ceylon, and gives an abundant autumn watering to those parts which receive but little in the summer. The rains in October and November thus characterize the setting-in of the N.W. monsoon, and, as the rain is due to a southerly current driven back, this monsoon is sometimes called the "retreating" or the "return" monsoon.

244. In temperature the southern part of the peninsula contrasts strongly with the northern provinces, and especially with the North-West Frontier Province, where the climate is essentially continental. A comparison of the isotherms for

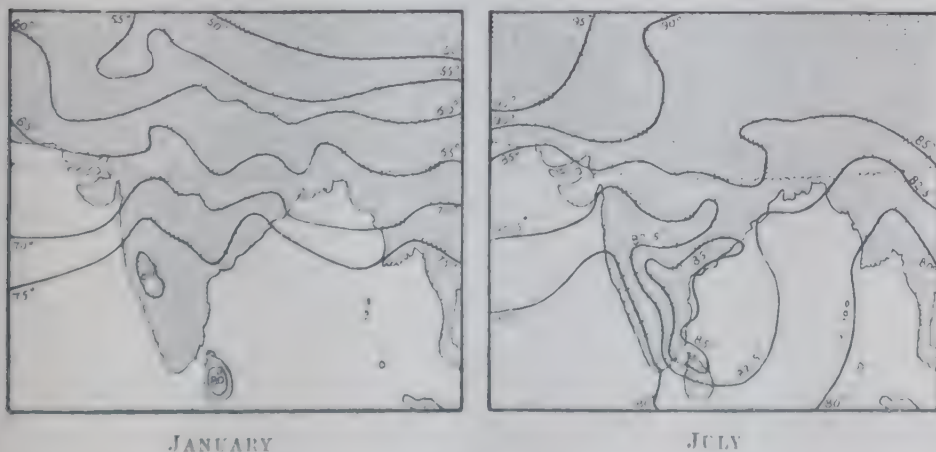


Fig. 70. Summer and Winter Isotherms.

January and July will show that over a small area in the south of Bombay there is hardly any difference between the mean temperatures of summer and winter, and along the coasts of Madras the difference is only about 10 F. In the North West

Frontier Province, however, there is a difference of 40°F . But great as the seasonal variations are in the north-west the diurnal variations are still greater. In Balūchistān a day temperature of 85°F . is not unfrequently followed by 5° of frost at night. The July isotherms illustrate in a very striking way the cooling influences of the south-west monsoon along the western coasts of India and Burma.

THE SOIL

245. We have seen that whenever rocks however hard, are exposed to the influence of air and water, heat and cold, they slowly crumble. This process, which is partly chemical and partly mechanical, is called "weathering." The soil is the product of long ages of such weathering, and though it is increased and enriched by the decay of plants and animals as well as by what it absorbs from the air, its character is chiefly determined by the nature of the rocks whence it is derived. In a country so large as India almost every kind of soil is found, but among many less widespread varieties there are three which should be specially noted.

246. The great Indo-Gangetic plain is formed entirely of alluvium, *i.e.*, of soil deposited by the rivers which intersect it. It is composed of the weathered product of many kinds of rock washed down and mixed together by the mountain torrents, and deposited as a rich and fine mud, free from even the smallest pebbles. In most parts of the plain this alluvium is of great depth, varying in the Ganges delta from 200 to over 600 feet. In the east, where the supply of water is plentiful, it is a mixture of water-holding clay and lighter loam; further west, especially in the Punjab, the lighter loam predominates; in Sind, where the rainfall is very scanty and vegetation is scarce, the loam is largely mixed with sand, and in some places the soil is nothing but sand for a hundred feet below the surface. Alluvial plains, similarly deposited, also skirt the coasts of the peninsula. Those on the east are much broader than those on the west, and extend far inland into the Deccan along the valleys of the great rivers. Alluvial soil, when well watered, is generally rich and fertile.

247. Peninsular India is chiefly composed of very ancient crystalline rock, but in the north-west there is an enormous area of much more recent, and much softer, basaltic rock, known as Deccan Trap. The hard crystalline rock weathers very slowly, and the soil is therefore comparatively shallow except where it has accumulated in the valleys. It is also so light and sandy, that the rain sinks quickly into it, and unless

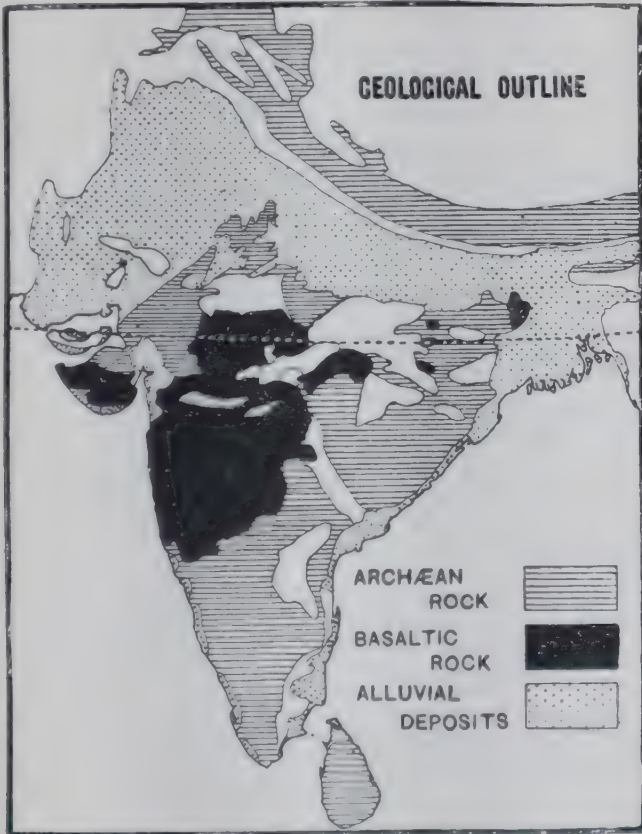


Fig. 71. Showing the prevailing rocks.

the water collects in hollows of the rock below, it soon drains away into the rivers and is lost in the sea. Even after the heaviest rainfall such soil speedily dries up, and therefore, to maintain it in full fertility, it usually needs artificial watering for the greater part of the year.

248. The Deccan Trap is of volcanic origin. At a comparatively late period in the geological history of India the north-west of the Deccan was the scene of immense and repeated volcanic disturbances. Enormous quantities of molten rock

were poured out, which covered an area of over 200,000 square miles to a great depth. In some places the Deccan Trap is more than 6,000 feet in thickness. This basaltic rock weathers much more quickly than crystalline rock, and forms a heavy, black, water-holding soil of exceeding richness and fertility, which is known in India as the **black cotton soil**. From this soil the water does not drain rapidly away, and artificial watering is much less needed.

IRRIGATION

249. Although the rainfall in a given district may be abundant if the year be considered as a whole, yet if the rains are confined to particular months and there is a long "dry season" the surface-soil will inevitably be dry for many months of the year, and the cultivator must have recourse to surface watering if he is to make the most of his land. Where deep water-holding soil prevails a sufficient supply of water for this purpose can commonly be obtained from wells, the rain which has sunk to a great depth being thus brought again to the surface. But where the soil is shallow, or very light and sandy, wells cannot be depended on as they soon dry up. Irrigation from wells is practised in almost all parts of India. Land so watered is not, however, in the technical sense, irrigated land, that designation being confined to land watered by *public works*, either from rivers or tanks.

250. The plains of North India, with their great perennial rivers, offer peculiar facilities for irrigation on a large scale. The rivers, being snow-fed, yield a sufficient supply of water even in the dry season. Canals are so constructed as to draw off the water from the rivers at the highest part of the plain, and then the gentle slope of the land gives the fall necessary for steady flow and easy distribution. As an illustration of this system we may take the Upper Ganges Canal which has been in operation for more than half a century. The canal-head is near Hardwār, where the Ganges is a fair-sized river even in the driest season. The head-works are of solid masonry, and are so arranged as to draw off about 6,500 cubic feet of water per second. This great volume of water is carried across the course of other mountain streams without disturbing them,

passing under one by means of a tunnel, and over another by an aqueduct two miles in length. It is then carried for over 450 miles in main canals, and by means of 4,500 miles of smaller distributaries waters an area of 1,500 square miles. Further down another canal, the Lower Ganges Canal, takes off an equal volume of water, and these two together give an unfailing supply to almost the whole of the doāb between the Ganges and the Jumna. Similar canals draw their water from almost all the main tributaries of the Ganges and the Indus, and some are of even greater magnitude.

251. In some parts a different system is adopted, the canals being filled only when the river is in flood. Such canals are distinguished as Inundation Canals. The Indus, owing to the high level of its bed, offers peculiar facilities for this system, which, though not affording so efficient a protection, has the advantage of cheapness. The solid masonry canal-heads give place to simpler earth-works which are much less costly. Sind is almost entirely dependent upon irrigation of this kind.

252. In the peninsula canal irrigation is much more restricted than in the northern plains, as the rivers, not being snow-fed, do not offer a continuous supply of water till they are comparatively near the sea. It is therefore in the deltas of the great rivers that the chief irrigation works of the peninsula are found. The waters of the Mahānadi, the Godāvāri, the Kistna, and the Cauvery, are all thus utilised. An anicut, or masonry dam, is thrown across the river near the apex of its delta, which confines the water and prevents it running away too rapidly to the sea. The level of the water above the anicut is thus considerably raised and a fall secured which enables it to be easily distributed. The irrigation systems which water the deltas of these four great rivers give an unfailing supply to more than 4,000 square miles of exceedingly fertile land.

253. In the interior of the peninsula irrigation is chiefly from tanks. There are no perennial snow-fed rivers, and the rainy season lasts only for a few weeks. Moreover the character of the land is such, especially in the south and east, that the rain that falls upon it speedily drains away. The problem that the agriculturist, or the Government, have to face, therefore, is how to preserve the water for future use. This is solved by storing it in "tanks" which may be anything from mere

ponds to lakes five or six miles in length. These tanks are usually constructed by throwing a bund of masonry, or earth-work, across a narrow valley through which a stream passes, thus confining the natural drainage. Or sometimes they are constructed at some distance from a river, whose waters are artificially turned into them. The water thus stored is available for use when the drier weather comes, and is distributed by a network of channels running in all directions according to the fall of the land.

254. In the Madras Presidency alone there are 60,000 such tanks of all sizes. Many of them are ancient works, but most of the larger ones have been constructed in recent years. One illustration may be mentioned—the Periyār Project, as it is called. The Periyār is a river on the western side of the Western Ghāts whose waters were formerly lost in the Arabian Sea. They are now diverted and carried through a tunnel to the eastern side of the Ghāts where water was greatly needed. There they feed a vast artificial lake capable of watering 300 square miles of land.

NATURAL PRODUCTS

255. Vegetable productions. *Rice* is very largely cultivated in Bengal and Burma and round the coasts of the peninsula. *Ragi*, *bajra*, *jowar*, and some other grains, which together are called *millets*, are grown in the drier districts and are the chief food-grains in most parts of India. *Wheat* is largely grown in the Punjab, the Central Provinces and Central India. *Gram* and other *pulses*, *barley* and *maize*, are also extensively grown and form important foods. *Cotton*, *opium*, *jute* and *indigo* are also valuable crops. Cotton is chiefly grown in the north-west of the Deccan and in Kāthiāwār; opium in Bihār and Mālhwā, jute in the delta of Bengal, and indigo in Bihār, Bengal and Madras. Opium is a Government monopoly, and its cultivation is prohibited except under license. Indigo used to be one of the most important commercial crops in India, but it has greatly declined of late owing to the use of a chemical blue dye which is cheaper though not so good. *Tea* is increasingly grown in Assam and on the slopes of the Himālayas, and to a less extent on the Nilgiris.

Coffee is cultivated on the Nilgiris and the South-Western Ghâts. Owing to a variety of causes, however, coffee has not been very successful in India, and it does not seem as though Indian coffee could ever compete with the product of Brazil. Bengal produces large quantities of *oil-seeds*, particularly *linseed*, *rape*, *jinnih* and *mustard*. *Cardamoms* and *pepper* are extensively grown in Travancore.

256. The **forests** yield many valuable timbers, especially *teak*, *sal*, *sissoo*, *ebony* and *blackwood*. The *palms* are especially characteristic of India. By far the most valuable is the *coconut*, which yields copra and coir, both important articles of export. *Copra* is the dried kernel of the nut from which oil is expressed, and *coir* is the fibrous husk from which rough ropes and matting are made. The *areca*, *palmyra*, and *date* palms are also cultivated. The *bamboo*, a giant grass, is a valuable forest product and grows in all parts of India where warmth and water are plentiful. The *cinchona* shrub, which yields a bark from which quinine is obtained, has been introduced from South America, and is successfully cultivated both on the Himālayas and Nilgiris. The *india-rubber* tree is also cultivated with considerable success both in Burma and Assam.

257. From the indiscriminate felling of forests parts of India that were once well watered are now dry and parched. The British Government has therefore paid great attention of late years to the protection of forests and the increase of forest areas. At the present time more than 250,000 square miles of demarcated forest land are under the care of the **Forest Department** which was created in 1861, and many thousands of square miles of mountain slopes have been planted with useful forest trees and shrubs.

258. **Minerals.** *Iron* is plentiful in many parts of India but the native manufacture of the metal has almost died out owing to the scarcity of fuel. The only place where iron is produced in any quantity to-day is Rāniganj in Bengal, where the ore is found in conjunction with *coal* and *limestone* and the iron industry is rapidly growing. *Coal* is found in Bengal, Central India, Hyderābād and Assam, and the total produce is now about 8 million tons a year, chiefly from Bengal. *Salt* is collected from Lake Sāmbar in Rājputāna, and on the coasts of the peninsula it is extracted from sea water. *Rock-salt* is

obtained in the Punjab. *Saltpetre* is produced in considerable quantities in Bihār. India has long been famous for its *diamonds*, but few are now found. *Rubies* and *sapphires* are found in Burma. *Gold* is obtained in large quantities in the Mysore. There are valuable *petroleum* fields in Burma and Assam, the produce of which is rapidly increasing. *Manganese* is found in Madras and the Central Provinces, *mica* in Bengal, *plumbago* in Travancore.

259. Animals. *Sheep*, *goats*, *oxen*, *buffaloes*, *dogs*, *horses*, and *camels* are the principal domestic animals. *Elephants*, *tigers*, *cheetahs*, *bears* and various species of *monkeys* and *deer* are numerous in the forests; the *rhinoceros* is found in the east. *Silk-worms* are reared in Bengal. The *fisheries* along the coasts are productive.

260. The *lion* is nearly extinct but a few are still found in Gujarāt. The *wild ass* is met with in Cutch. The *gaur*, a very large wild ox, is found in some mountain jungles. *Snakes* are plentiful, and a few of them, especially the cobra, are very poisonous. Nearly 20,000 persons die every year from snake bites. Crocodiles abound in many of the rivers.

261. The *adjutant crane* is common in Bengal; the *vulture* is found in most parts of India, and the *kite* everywhere. These birds, as well as the *jackal*, which is common in every province, are useful as scavengers. They devour animal refuse which would otherwise pollute the air.

MANUFACTURES AND COMMERCE

262. The Hindus have long been celebrated for their muslins, silks and shawls. *Weaving* is carried on throughout the country. The use of machinery in Europe, and of late in India, has considerably reduced the amount of hand weaving in India. There are now over 200 steam *cotton mills* in India which give employment to nearly a quarter of a million people. Numerous *jute mills* in Bengal manufacture gunny bags and jute cloth, both used for packing and largely exported. There are also steam *woollen mills*, *paper mills*, and numerous jute and cotton presses, and large quantities of jute and cotton goods are exported. In Bengal there are large and growing *engineering works*. Brass vessels and coarse pottery are made almost everywhere.

263. Foreign Commerce. During 1906-07 the total value of the foreign trade of India was over 240 millions sterling, of which $11\frac{1}{2}$ millions was by land and the rest by sea. The exports exceeded the imports by nearly 14 millions. For many years the foreign trade of India has developed with remarkable rapidity, and the rate of increase is growing. In the last six years the total annual value has increased by slightly over fifty per cent. The following are the chief articles of export and import trade. The figures following each article give the total value of the import or export for the year 1906-07, expressed in millions of pounds sterling :—

Imports. Cotton goods, $27\frac{1}{4}$; metals, $6\frac{1}{2}$; machinery and railway materials, $6\frac{1}{2}$; sugar, $5\frac{1}{4}$; provisions and liquors, $2\frac{3}{4}$; mineral oils, hardware and silk, about $1\frac{1}{2}$ each.

Exports. Jute, raw and manufactured, $22\frac{1}{4}$; cotton, raw and manufactured, $22\frac{3}{4}$; rice, $12\frac{1}{4}$; hides, $10\frac{1}{4}$; oil seeds, $8\frac{1}{2}$; tea, $6\frac{1}{2}$; opium, $6\frac{1}{4}$; lac, $2\frac{1}{4}$; wool, $1\frac{1}{2}$.

264. The total value of India's trade with Great Britain during the same year was 80 millions sterling, with Germany, $16\frac{1}{2}$ millions; China, $13\frac{1}{2}$ millions; United States, 12 millions; France, $8\frac{1}{2}$ millions; Austria Hungary, 8 millions; Belgium, $7\frac{1}{2}$ millions; Strait Settlements, $6\frac{1}{4}$ millions; Japan, $5\frac{3}{4}$; and Ceylon, 5 millions.

265. The port of Calcutta has about 41 per cent. of the total seaborne trade of India; Bombay, 30 per cent; Karāchi, $8\frac{1}{2}$ per cent.; Rangoon, 8 per cent.; and Madras, 5 per cent.

COMMUNICATIONS

266. Until about 75 years ago the great waterways of India were practically the only highways of commerce. There were no great trunk roads till about 1830, and no railways till nearly 25 years later. The waterways of India are still important, and they probably carry a larger amount of merchandise to-day than they did before either roads or railways were constructed. But without the latter the growing commercial prosperity of India would have been impossible.

267. Roads. There are now more than 200,000 miles of road under the care of the various local authorities in India. More than half of these roads are metalled and well adapted for heavy wheeled traffic, the gradients being gentle. Great

engineering skill has been shewn in the construction of roads across some of the peninsular mountain ranges.

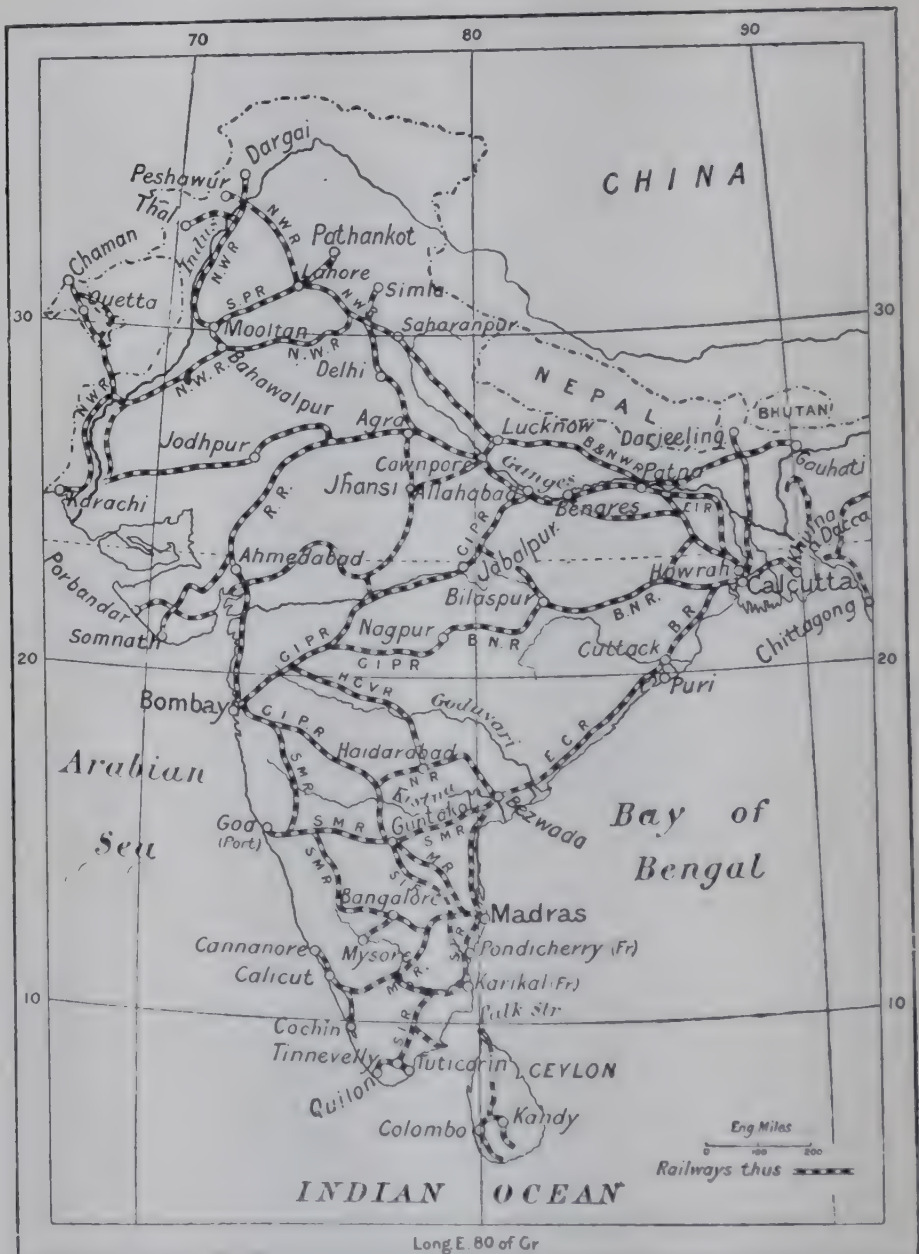


Fig. 72. The Chief Railways of India.

268. **Railways.** The first Indian railway was constructed in 1853. As late as 1870 there were less than 5,000 miles of

railway open; the total mileage now is over 30,000, and it is rapidly increasing. The map shows the great trunk-lines which now unite all the large cities, while a multitude of smaller lines branching off from these in various directions put many of the smaller towns into direct railway connection with the great centres of trade. Most of the great Indian railways were constructed by private companies, but the Government guaranteed a fair interest on the capital expended, and in return reserved the final control of the lines and the right to purchase them. This right has in most cases been exercised, and the great majority of Indian railways are now the property of the State. Several of the more advanced Native States have followed the example of the British Government, and have constructed railways within their territory at public expense.

269. Foreign Communications. With the exception of the mountain passes the external communications of India are entirely by sea. The passes are the laborious and costly routes of a small trade between India and the neighbouring Asiatic countries, particularly Tibet, Afghānistān, and Persia, with which they are likely to remain the sole means of communication for many years. But by sea India is now served by many lines of steamships, and has direct communication with most parts of the world. The chief lines of sea-communication pass westward through the Suez Canal and eastward through the Straits of Malacca. From Calcutta, Bombay, Karāchi, Madras, and now from Goa, steamers sail regularly for many European ports. Bombay and Calcutta have also direct communication with the ports of China and Japan. There are regular steam services round the coasts, and also to the chief ports of Africa and Australia. The greater part of the trade of India is carried on through the Suez Canal.

270. Postal and Telegraph Services. India has one of the most efficient postal services in the world. In no other country can a closed letter be sent 2,000 miles for a halfpenny, or a postcard for a farthing. The value-payable parcel system is a convenience which Great Britain is as yet (1908) only hoping to obtain, and the excellence of the Indian money-order system is equalled only in Germany. Almost every town of any magnitude is now also connected with the outer world by telegraph. The telegraph service is worked in connection with the railway and canal systems as well as with

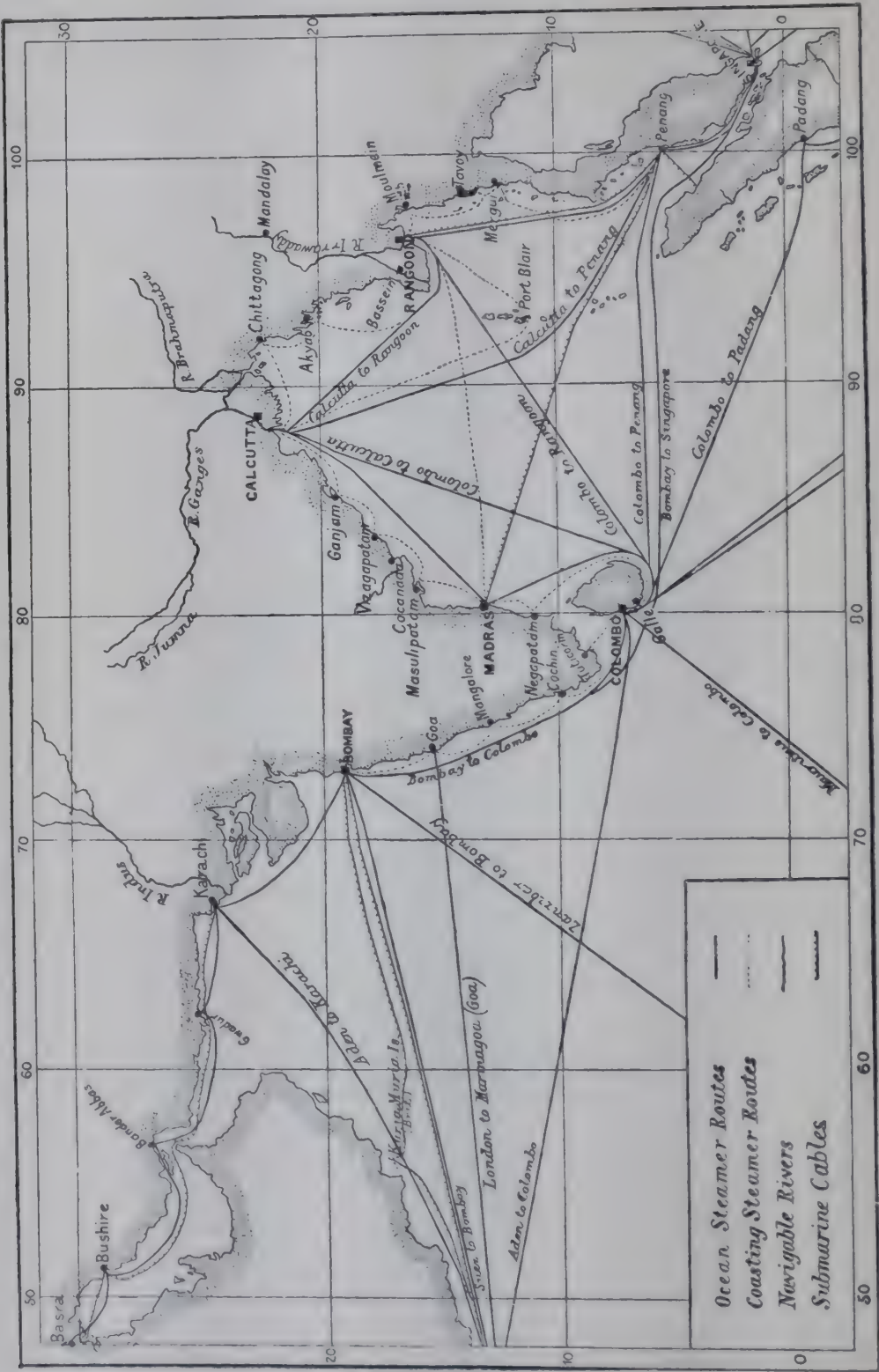


Fig. 73. Showing the chief lines of foreign communication.

the post office. About 7,000 telegraph offices are open to the public. Three great trunk-lines, partly of sea-cable and partly of land-wire, connect India with Europe.

PEOPLE AND LANGUAGE

271. The people of India belong mainly to the great **Caucasian** family, but both in the north-east and the north-west there is a certain infusion of **Mongolian** blood. The two Caucasian races represented in India are the **Dravidian** and the **Aryan**. When the Dravidians entered India it is impossible to say, for there are no definite traces of any earlier inhabitants. Probably at one time they occupied the whole of the peninsula and the northern plains. Two distinct waves of Aryan immigration can be traced, the first in all probability reaching India by way of Persia and the western passes, and the second by way of Chitrāl. The Aryans pressed the Dravidians to the



Fig. 74. Showing Race Distribution.

south, but at the same time very largely mingled with them. Pure Dravidian blood is now found only in the centre and east of the peninsula, while a mixed Aryan and Dravidian race stretches northward almost to the Himālayas.

272. On the north-east the purer **Mongols** of Western China who people Burma and the Himālyas entered India and mingled with the Dravidians in the Ganges delta and along the Orissa coast. In the north-west **Mongolo-Tartars** of *Turki* and *Scythian* descent, from the steppes of Central Asia, mingled with the Dravidians and Aryans. The map on p. 123 shows the general distribution of these races in India, according to the *Census Report* of 1901. It should be remembered, however, that such a map can be only approximate, and merely shows the *general racial characteristics* of the bulk of the people.

273. Dravidian languages are much less widely diffused in India than Dravidian blood. This is natural, as it is almost everywhere found that conquered races adopt the language of their conquerors. Dravidian tongues prevail only where Dravidian blood is comparatively pure. Throughout the whole of North India the languages spoken are Aryan in character. The principal **Dravidian** languages are *Tamil*, *Telugu*, *Malayālam* and *Kanarese*, and the principal **Aryan** languages are *Hindī*, *Bengali*, *Bihārī*, *Marāthī*, *Punjabī*, *Rājasthānī*, *Gujarātī*, and *Oriyā*.

274. Numerous **Mongolian** languages of the *Tibeto-Burman* group are spoken in Burma, parts of Assam, and on the slopes of the Himālayas. The principal of these is *Burmese*, which is spoken by about six millions.

275. **Population.** The population of the Indian Empire in 1901 was over 294 millions, being nearly equal to that of Europe. Taking the country as a whole the average number of inhabitants to the square mile is 188; but in some parts there are 600, and one District has 870. The densest population is found in the Provinces of Bengal, Agra and Oudh, where the soil is rich and the rainfall abundant. India is essentially a rural country. Less than one-twentieth of the inhabitants live in towns, and about three-fifths (175 millions) are engaged in agriculture. Next to agriculture come weaving and the manufacture of dress fabrics, which employ about 12 millions.

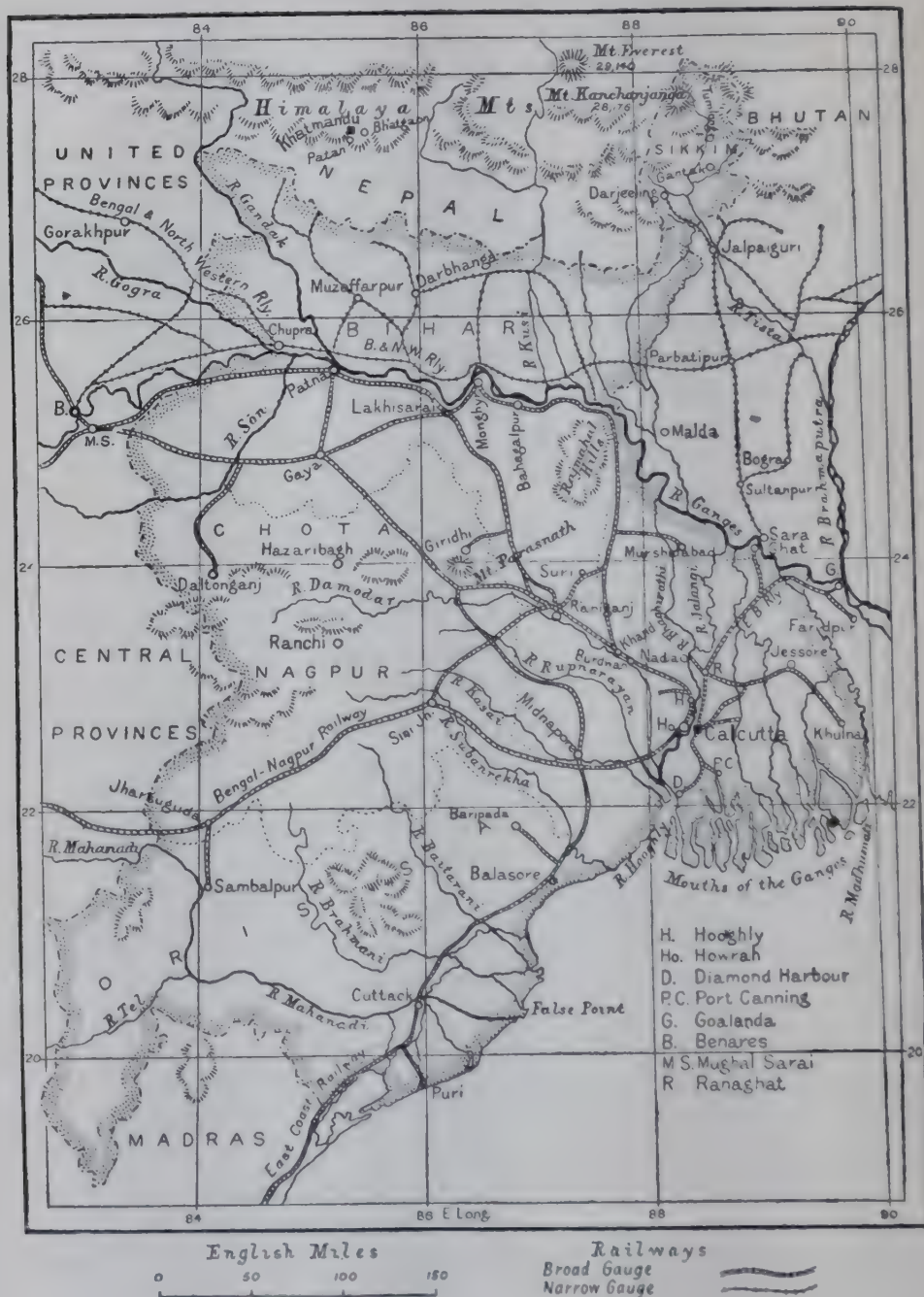
GOVERNMENT

276. The **Supreme Government** in India is vested in the *Governor-General*, or Viceroy, who is appointed by the Crown and carries on the government in the name of the Emperor. The Viceroy is assisted by an *Executive Council* of six members, and a *Legislative Council* which enacts laws for the whole of the Indian Empire. The Provinces of **Madras** and **Bombay** are under *Governors* who are also appointed by the Crown and have both *Executive* and *Legislative Councils*. **Bengal**, **Eastern Bengal and Assam**, the **United Provinces of Agra and Oudh**, **Punjab** and **Burma** have each a *Lieutenant-Governor* who has a *Legislative Council* only. The other British Provinces are under *Chief-Commissioners* who have no councils. The entire Government of India is subject to the control of the *Secretary of State for India* who is a member of the British Government for the time being, and is assisted by a **Council** composed of members who have held high office in India.

277. The **Provinces of British India**, with their area and population, are shown in the following table :—

Administration	Area in square miles	Population, 1901
<i>Under Governors :—</i>		
Madras	141,726	38,209,436
Bombay and Sind (with Aden) ..	123,064	18,559,561
<i>Under Lieutenant-Governors :—</i>		
Bengal	115,819	50,722,067
Eastern Bengal and Assam ..	106,130	30,961,782
United Provinces of Agra and Oudh	107,164	47,691,459
Punjab	97,209	20,330,339
Burma	236,738	10,490,624
<i>Under Chief Commissioners :—</i>		
Central Provinces and Berār ..	100,345	11,991,670
North-Western Frontier Province	16,466	2,125,480
British Balūchistān	45,804	308,246
Ajmer-Merwāra	2,711	476,912
Coorg	1,582	180,607
Andamans and Nicobars	3,143	24,619
Totals	1,097,901	232,072,832

BENGAL



Subanrekhā, all drain Chotā Nāgpur. The two first join the Hooghly between Calcutta and the sea. The **Brāhmanī** and **Baitaranī** drain northern Orissa and Chotā Nāgpur, and join the Mahānadi at the delta.

283. The people of Bengal are mainly Dravidian in race. In most of Orissa and Chotā Nāgpur they are pure Dravidians, along the coast and in the Ganges-Delta Mongolo-Dravidians, and in Bihār chiefly Aryo-Dravidians. The Bengalis and Bihāris have no great physical vigour or strength of character ; but they are acute and intelligent, and not slow to adapt themselves to new circumstances. About five-sixths of the people are Hindus, and the rest Muhammadans.

284. The total population of the province, including the Native States, is nearly 55 millions, of whom less than 4,000,000 are dwellers in towns. Bengal is a province of villages, and agriculture is the chief occupation of its people. The density of population is about 440 to the square mile. But the Delta and Bihār are more thickly peopled, having about 650 to the square mile.

285. **Productions.** More than half the whole area of Bengal is composed of the rich alluvium brought down by the rivers, and is exceedingly fertile. The abundant rainfall and warm, damp atmosphere are also favourable to vegetation. The crops are, therefore, heavy, and in many parts the land is cropped twice a year. The chief food-grain is *rice*. Bengal produces more rice than all the rest of India and Burma put together. Next to rice *jute* is the most valuable vegetable product. *Wheat*, *barley*, *maize*, *pulses* and *millet*s are grown in the drier parts of Bihār, Chotā Nāgpur, and Orissa. *Oil-seeds* also are largely cultivated, especially *rape*, *mustard*, and *linseed*. *Sugar cane*, *opium*, and *tobacco* are important crops. *Cotton* is grown in Bihār and *tea* is extensively cultivated in the Darjeeling district.

286. *Coal* is found at Rāniganj, Girīdhī, and a few other places. At Rāniganj also *iron ore* is found and considerable quantities of the metal are produced. Bihār yields *saltpetre*, and *mica* is obtained at Hazāribāgh.

287. **Manufactures and Commerce.** In addition to the hand-industries common throughout India, Bengal has extensive industries carried on by steam power. The jute mills are the most important. Jute fibre is woven into *jute cloth*

BENGAL IN RELIEF



Fig. 76.

and *gunny bags* which are exported in large quantities. *Cottons, silks, ropes, paper, sugar, and soap* are also manufactured, and there are large engineering works where *machinery of all sorts* is made.

288. The chief **exports** of the province are rice, jute, opium, tea oil-seeds, saltpetre, and silk. The chief **imports** are cotton and woollen goods, machinery and hardware, liquors, glass and oils.

289. Communications. Almost all the large towns of Bengal are now connected by rail. The *East Indian Railway* follows the course of the Ganges, joining many important river-side towns. The *Eastern Bengal Railway* runs north-east to the Brahmaputra; and another branch due north to the foot of the Himālayas, whence a mountain railway runs to Darjeeling. The *Bengal and North Western Railway* runs north of the Ganges and unites Bengal with Oudh. The *Bengal-Nāgpur Railway* joins Bengal to the Central Provinces, and the *East Coast Railway* gives direct communication between Calcutta and Madras. All these railways have numerous branch lines.

290. The waterways of Bengal are scarcely less important than the railways. Over 100,000 cargo boats are continually plying on the Ganges. In a great part of the delta the innumerable channels of the river almost take the place of roads, and form the principal means of communication.

CHIEF TOWNS

291. CALCUTTA, the capital of the Indian Empire, was founded in 1686. In 1756 the town was sacked and almost destroyed by Sirāj-ud-daula, but was speedily retaken by Clive. Though the city is only 150 years old it has now (including its suburbs) a population of over 1½ millions, and is the second city in the British Empire.

292. This rapid development is due to the fact that before railways were constructed Calcutta, being situated on the great waterway of the Ganges, was the natural outlet for the produce of the richest provinces of the Empire. The river at Calcutta gives good anchorage for ships, but it is 86 miles from the sea, and the Hooghly being a deltaic river is constantly silting up, so that the channel can only be kept clear by incessant dredging. In spite of this great difficulty,

Calcutta speedily became, and still remains, the premier port of India. The principal docks are at Kidderpore, but there is good anchorage for vessels of average size extending for over 10 miles. The bed of the river is under constant inspection, and no vessel is allowed to pass either up or down except in charge of a certificated pilot.

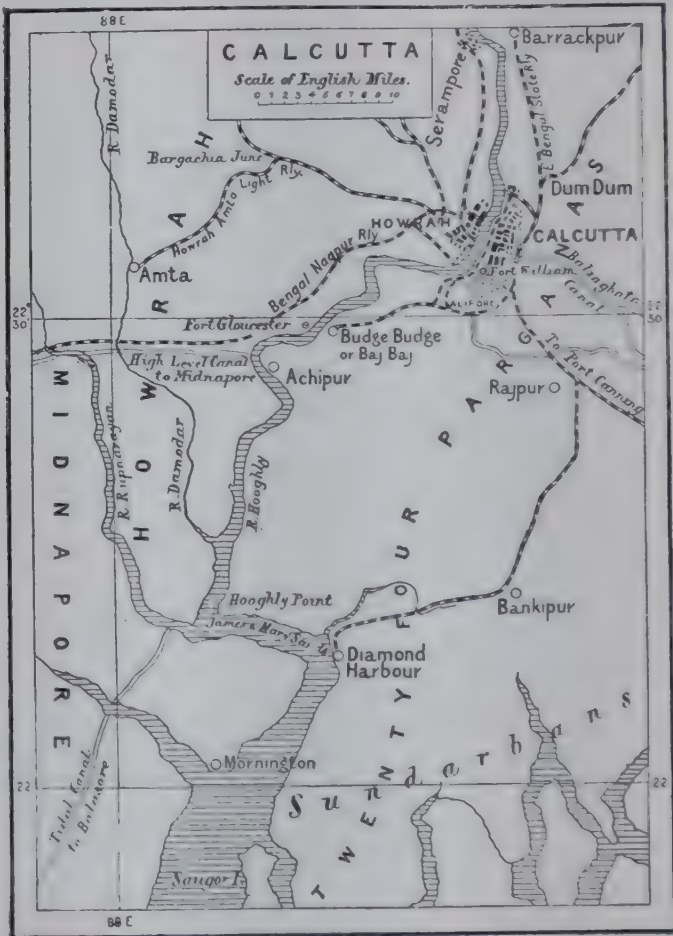


Fig. 77. The Hooghly and Calcutta.

293. Calcutta is the seat of a University, and has numerous colleges for general education as well as for instruction in Arts, Law, Medicine, and Engineering. It has also an excellent Museum and Zoological and Botanic Gardens. The city has extensive suburbs. **Alipore**, four miles south of Fort William, is the residence of the Lieut.-Governor of Bengal. **Dum-Dum** and **Barrackpur** to the north are both Military stations. At

the opposite side of the river is the great suburb of **Howrah**, now a separate municipality, with about 160,000 inhabitants. Howrah is a great industrial centre, and is connected with Calcutta by a pontoon bridge. Here are the termini of the East Indian, the Nāgpur, and the East Coast Railways.

294 **Nadiā**, on the Bhāgirathī was once a Hindu capital of Bengal. **Murshidābād** was the last Muhammadan capital and is still the residence of the Nawāb of Bengal. **Rāniganj** on the Dāmodar, is rapidly growing in importance as the centre of the coal mining industry. **Chinsura** was formerly a Dutch settlement. **Chandernagore**, south of Chinsura, belongs to the French. **Seram-pore**, still farther south, was ceded to Britain by the Danes. **Darjeeling**, 7,000 ft. above the sea, is a popular and exceedingly beautiful hill resort on the Himālayas, and the summer seat of the Bengal Government. Tea is grown in the surrounding districts.

295 **Patna** the largest city in Bihār, has a population of 135,000. Before railways were constructed it was one of the greatest trading centres on the river, being near the junction of the Ganges, Gogra, Gandak and Sōn. Bihār opium is collected at Patna. **Gayā**, a noted place of pilgrimage, lies south of Patna, and is connected with Patna by rail. **Monghyr**, further east, is an ancient town, once noted for its fort. At **Lakhisarai**, south-west of Monghyr, the "chord" or straight line, of the East Indian Railway, joins the "loop," or semi-circular line. At **Bhāgalpur**, still further east, the Ganges is seven miles wide. **Muzaffarpur** and **Darbhanga** lie to the north of the river. They have both suffered through the decline of the indigo industry.

296 In Orissa and Chotā Nāgpur there are few towns of any moment, the hilly parts of both these divisions being largely overrun with jungles and inhabited only by primitive tribes. **Cuttack**, the largest town in Orissa, is on the Mahānadī. **Purī**, on the coast, is noted for its temple of Jagannāth and is a great place of pilgrimage. **Sambalpur** (recently transferred from the Central Provinces) was once famous for its diamonds. **Rānchī** and **Hazāribāgh** are the chief towns in Chotā Nāgpur. Neither of them is as yet touched by any railway. At **Hazāribāgh** mica is found.

297. **Native States.** The native states subject to Bengal are very numerous but of little moment. They are chiefly in Chotā Nāgpur and Orissa. **Sikkim** is a small mountainous country between Nepāl and Bhutān, which has been under British protection since 1890. Its area is about 3,800 square miles, and its population 60,000. The principal trade route between India and Tibet passes through the State. The chief towns in Sikkim are **Tumlong** and **Gantak**.

EASTERN BENGAL AND ASSAM.

298. **EASTERN BENGAL AND ASSAM** is bounded on the west by the Province of Bengal, on the north by Bhutān and the Himālayas, and on the south by the Bay of Bengal. On the east the boundary runs along the Khamti, Pātkai, and Nāgā Hills in the north and the Lushais and Chittagong Hills in the south, while in the centre it coincides with the eastern boundary of the native State of Manipur. The coast district of Chittagong was ceded by the Nawāb of Bengal in 1760. Assam and the Cāchār valley were annexed in 1826 after the first Burmese war. The Bhutān war in 1865 led to the annexation of a long strip at the foot of the Himālayas known as the Duārs, and British authority was also at various times extended over portions of the South-Eastern hills. Till 1874 all these territories belonged to Bengal, but in that year **Assam, Sylhet** and **Cāchār**, together with the **Hill Tracts**, were made into a separate province under a Chief Commissioner, whose headquarters were at Shillong on the Khāsis. In 1905 the **Eastern Districts of Bengal** were united with **Assam** to form the present Province, which was placed under a Lieutenant-Governor with a Legislative Council. The seat of Government was at the same time removed from Shillong to **Dacca**.

299. **Surface.** Along the east there is a tract of hilly country stretching from the **Chittagong Hill Tracts** and **Hill Tippera** to the **Khāmtis** in the north-east. This belt of hills is about 150 miles broad in the south-west, where it is composed of a series of ridges running roughly north and south, and narrows toward the north-east where the ridges bend round and gradually converge. From its central portion a tongue of hilly country including the **Khāsi, Jaintia** and **Gāro Hills** stretches out to the west, and the **Mikir Hills** stretch northwards almost to the Brahmaputra. The rest of the province is almost all low-lying plain. The long, narrow valley of the Brahmaputra stretches from the north-eastern extremity of the province to the point where the river rounds the Gāro Hills, and the delta begins. South of the Khāsi Hills another plain stretches to the east, including **Sylhet** and **Cāchār**. Nearly half the province is thus composed of rich and well watered land.

300. **Rivers.** For the final 800 miles of its course the **Brahmaputra** river flows through this province alone. It is in flood after the summer rains, which are exceedingly heavy all along its course, but, owing to the melting of the snows in Tibet, it continues to flow in great volume far into the winter



Fig. 78. Eastern Bengal and Assam.

months. It brings down enormous quantities of rich mud with which it fertilises many thousands of square miles. Throughout its entire length from north east Assam to the sea the Brahmaputra is navigable, and river steamers ply upon it as well as a vast multitude of sailing boats. The **Surmā** and **Barāk** which unite to form the **Meghnā** flow through the valley

of Sylhet and Cāchār. These rivers drain hills which have an exceptionally heavy rainfall, Cherrapūnġi on the **Khāsis** having an average of over 600 inches a year. In seasons of flood, therefore, the Meghnā brings down an immense volume of water to the sea. In their lower courses the Meghnā, Brahmaputra and Ganges unite, and find their way to the sea through the many channels of their joint delta. The Meghnā is navigable at all seasons, and the Barāk and Surmā when in flood.

301. Climate. The low-lying districts of Eastern Bengal are in all respects similar to the rest of the delta. They are well watered both by rainfall and the rivers, and during the summer months an extremely moist, but not excessive, heat prevails. In the drier winter months, from November to March, the air is cool and pleasant. The valley of Assam is the wettest part of India. From March to October the rains are fairly heavy, and especially so from May to August. Along the river and the mountain slopes fogs are very prevalent in the winter.

302. People. In Eastern Bengal the majority of the people are of mixed **Mongolian** and **Dravidian** blood. In Assam and most of the hill tracts Mongolians of the **Tibeto-Burman** race predominate. In the hills there are a great variety of tribes, each of which speaks a Tibeto-Burman language of its own. **Assamese**, the prevalent language of Assam, and **Bengali**, that of Eastern Bengal, are both Aryan languages. The Assamese are mostly Hindus in religion. In Eastern Bengal Muhammadans greatly outnumber all others. Among the dwellers in the hills various forms of Animism prevail. In **density of population** the two parts of the province present a great contrast, Assam being thinly peopled while some of the Districts of Eastern Bengal have a population almost as dense as any in India. Nearly 60 per cent. of the entire population of the province live in a quarter of its area, where the density is over 600 to the square mile. On the other hand more than half the province has a density of less than 200 to the square mile.

303. Natural Productions. Along the lower slopes of the Himālayas stretch dense virgin forests, known as the **Duārs**. In many parts they are almost impenetrable, and are the home of elephants, tigers, and a special species of buffalo. Much

E. BENGAL AND ASSAM IN RELIEF

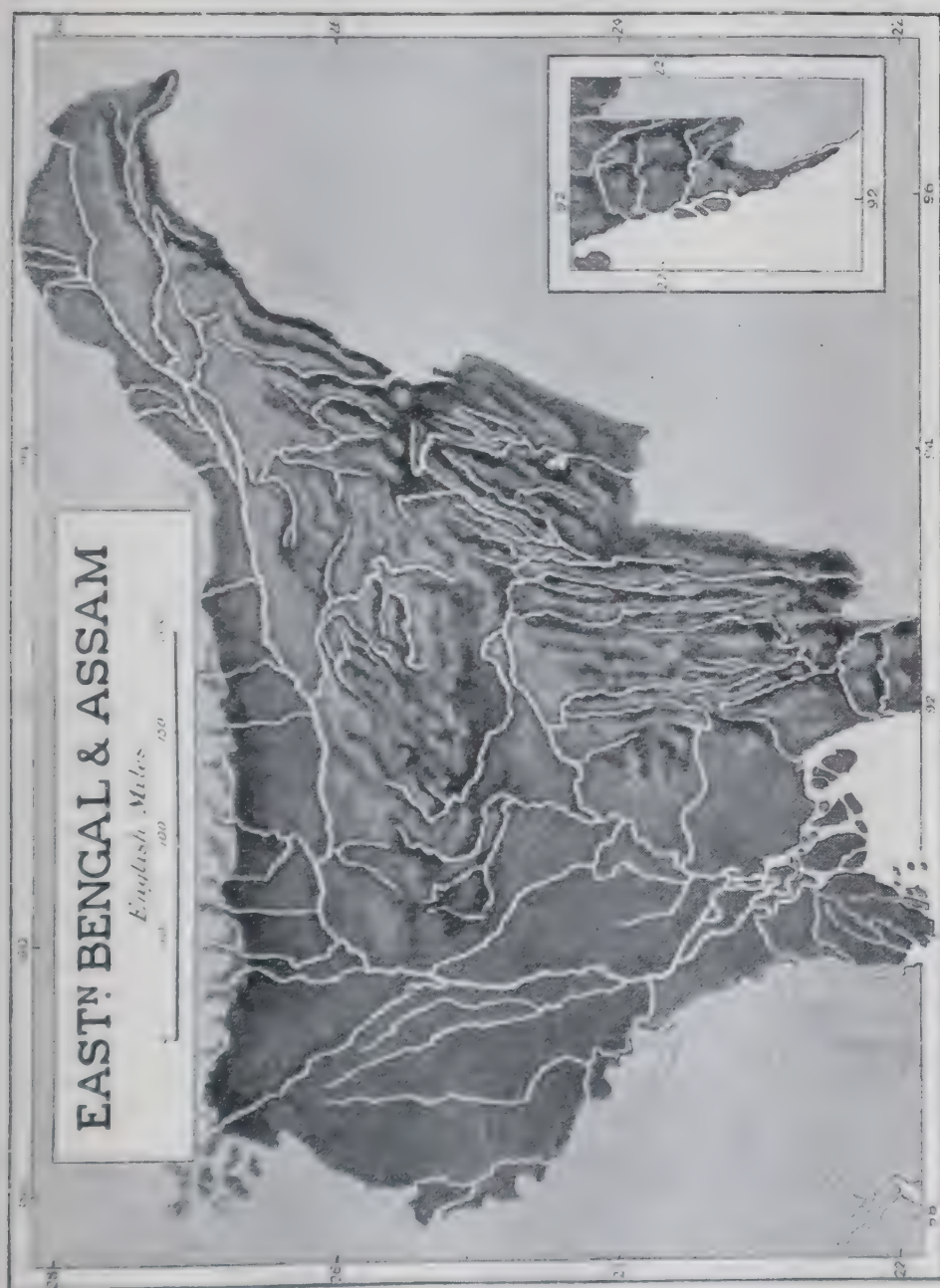


Fig. 79.

valuable timber, chiefly **sal**, **sissoo**, and **ironwood**, is obtained, and the hill tribes collect **india-rubber** from the rubber tree. A wild silk is also collected from which the fabric known as **Tusser Silk** is woven.

304. Along the northern slopes of the Nāgā and Pātkai Hills and on the hills of Cāchār and Sylhet, **tea**, the staple culture of Assam, is largely grown. On the plains of Eastern Bengal, **rice**, **oil-seeds**, **jute** and **tobacco** are the principal crops, while further north, **millets** and **pulses** are cultivated. The valley of Assam does not produce as much rice as is needed for the labourers in the tea plantations, and large quantities are carried up the river from Eastern Bengal.

305. **Assam** has several small coalfields, some of which yield **coal** of excellent quality. The only mines of any importance, however, are at Ledo, near Mākum, at the base of the Pātkai Hills, the yield of which is about 240,000 tons per annum. At Mākum there is a **petroleum** field which, in 1907, yielded over 3 million gallons of oil.

306. Communications. The rivers are the most important highways of commerce. Many excellent trunk-roads have been constructed giving easy communication with the hilly districts. Railways are being rapidly extended. The **Eastern Bengal Railway** runs northward from Sara Ghāt to Siliguri at the north-west corner of the province. Another line, belonging to the same system, crosses this at Parbatipur and unites the Ganges with the Brahmaputra. The **Assam-Bengal Railway** runs from Chittagong through Sylhet and Cāchār north-eastward to Sadiyā at the head of the Brahmaputra valley.

307. Chief Towns. **Dacca** (90,000) the capital of the Province is a flourishing town on the Burhīganga, which joins the Brahmaputra and the Meghnā, a few miles above the point where their main streams unite. Dacca was once a Muham-madan capital, and the seat of a luxurious court. It was long famous for its muslins, the finest and most delicate in the world, and greatly prized in the west. This industry has almost died out, however, and now jute goods are the chief manufacture. Dacca is the centre of the jute industry for Eastern Bengal, as Calcutta is for the western districts. **Nārāyanganj**, 10 miles to the south, situated at the juncture of the Brahmaputra and the Meghnā, is the port of Dacca and a growing town. A railway now connects the two towns and runs northward to

Nasirābād, an important trading centre in the rich and populous district of Mymensingh, and then westward to the **Brahmaputra**.

308. **Goālānda**, at the junction of the Ganges and **Brahmaputra**, and **Noākhālī**, near the Meghnā, in the south, are other important jute-growing centres. **Barisal** is a great rice centre in Backarganj. **Chittagong** is a growing seaport on the eastern coast of the Bay of Bengal, a little to the south of the most easterly channel of the delta. It is well situated and has a good harbour, being a few miles up a small navigable river, the Karnaphuli, and now that it is connected with Assam by rail it is rapidly becoming the chief port for its produce.

309. In Assam the principal towns are on the **Brahmaputra**. **Gauhati** is the largest town in the province. **Sibsāgar** and **Dibrugarh** further up the river, and **Sadiyā**, near its northern bend, are all great centres of tea manufacture. All these towns are now served by the Bengal-Assam railway. **Mākum** is the centre of the mining industry. **Sylhet**, the chief town in the valley of that name, is on the **Surmā**. The Sylhet valley is noted for its oranges, large quantities of which are sent down the river. **Silchār** on the **Barāk** is the chief town of **Cāchār** and a centre of tea production.

NATIVE STATES IN E. BENGAL AND ASSAM

310. The Native States of Assam are **MANIPUR**, **HILL TIPPERA**, and **COOCH BEHĀR**, with twenty-five smaller States situated in the central hilly tract and known jointly as the **KHĀSI STATES**. **COOCH BEHĀR** has an area of 1,300 square miles and a population of 567,000. It is fairly fertile, and has been opened up by a branch of the Eastern Bengal Railway. **MANIPUR** has an area of about 8,500 square miles but a population of only 284,000. The people are wild and semi-civilized hill races. **Imphal**, or **Manipur**, the capital, has a population of 67,000. **HILL TIPPERA** has an area over 4,000 square miles and a population of about 175,000.

NEPAL AND BHUTAN

311. These two Native States stretch along the whole of the eastern **Himālayas** from **Kumaun** to within 150 miles of the **Brahmaputra**, with the single exception of a strip of about 50 miles where the little State of **Sikkim** is wedged in between them. Geographically they both belong to India and though

they are generally regarded as Independent States they are completely controlled by the Government of India in all their foreign relations.

NEPAL

312. NEPĀL takes in the whole of the Himālayas from Kumaun in the west to Sikkim in the east, and is bounded on the north by Tibet and on the south by the United Provinces and Bengal. Its area is about 54,000 square miles, and its population is estimated at 4 millions.

313. History. A Rājput race who had settled in the district of Gurkha in Nepāl established themselves as rulers of the whole country in the latter half of the 18th century. They were first brought into relation with the Government of India in 1792 when a commercial treaty was signed. In 1814 a frontier outrage compelled the British to declare war, and when peace was restored in the following year the districts of Garhwāl and Kumaun were ceded to the British, and annexed to the Province of Bengal. Nepāl was also compelled to receive a British Resident. Since that time friendly relations have been maintained.

314. Physical Features. Throughout its whole length Nepāl embraces the main chain of the Himālayas, including the highest peak in the world, Mount Everest, which, according to the most recent measurements is 29,140 feet. The chief lines of drainage cross the main axis of the mountain range, the great rivers flowing southwards through deep gorges in the mountain chains. The **Kusī** drains the slopes of Mount Everest in the east and flows due south to the Ganges; the **Gandak** takes a winding southern course from the slopes of Dhaulāgiri and joins the Ganges near Patna; and the **Gogra** rises in Tibet and flows through the western part of Nepāl into Oudh. All these rivers receive many tributaries which drain the valleys running east and west.

315. Climate and Natural Products. Over the greater part of Nepāl the rainfall is heavy. The temperature varies with the altitude, being fairly high at the base of the hills where the long strip of pestilential *terai* is tropical in character. On the lower slopes of the mountains dense forests prevail, in which **sal** and **sissoo** abound. In the valleys **rice**, **wheat**, **barley**, the various **millets**, and **oil-seeds** are grown.

316. People. The **Gurkhas** are of **Aryan** origin, but two-thirds of the total population belong to the **Tibeto-Burman** branch of the great **Mongolian** family. The language of the Gurkhas, called **Parbatya**, is Aryan in character. Among the rest Tibeto-Burman dialects prevail. The Gurkhas are short in stature but vigorous. They have great endurance and enterprise, and love fighting for its own sake. They are allowed to enlist in the Indian Army, and form some of its best regiments.

317. Towns and Trade. There are only three towns of any consequence in Nepāl, all of which are in the Khātmāndu Valley. **Pātan** was the capital before the Gurkha conquest. **Khātmāndu** is the Gurkha capital. **Bhātgaon** is the chief centre of trade. Patan is said to have 65,000 inhabitants, each of the others 50,000. There is a growing trade between India and Nepāl. The **exports** from Nepāl include cattle, hides, various drugs, wheat and other grains, oil-seeds, tobacco, and timber; and the **imports** are cottons and woollens, metal wares, leather, salt, sugar, petroleum and spices.

BHUTAN

318. BHUTĀN lies east of Sikkim and is bounded by Eastern Bengal and Assam on the south, and by Tibet on the north. Its area is about 20,000 square miles, and its estimated population a quarter of a million, who are all Buddhists, and speak a dialect of Tibetan. The capital, **Punaka**, is a natural stronghold. The government is shared by the **Deb Rājā**, or secular head, and the **Dharma Rājā**, or spiritual head. The Indian Government obtains control over these rulers by a yearly subsidy of Rs. 50,000, in return for which they undertake to keep the tribes on the Indian frontier in order.

319. Bhutān is a maze of lofty mountains separated by well watered valleys. In climate it resembles Nepāl, being wet and cold on the mountains, wet and warm in the valleys. **Rice, maize, millets, pulses,** and many kinds of **fruit** are the chief vegetable products. There is a small trade between India and Bhutān amounting altogether to less than a lakh of rupees. Horses, cattle, ghee, wax, and a cloth of native manufacture are the chief **exports**. Rice, sugar, spices and tobacco are the chief **imports**.

THE UNITED PROVINCES OF AGRA AND OUDH

320. History. The greater part of the territory now included within the Province of Agra came under British control early in the nineteenth century, having been ceded by the Nawāb Wazīr of Oudh or the Marāthā Princes and incorporated with Bengal. In 1836 Bengal was divided and the North West Provinces made into a separate Government. The Kingdom of Oudh was annexed in 1856. For many years the rule of King had been corrupt and oppressive and had reduced the country to the utmost misery. He was therefore deposed, and for 21 years Oudh was administered by a Chief Commissioner. In 1877 it was united with the North West Provinces to form a Lieutenant-Governorship. In 1901, when the North-Western Frontier Province was formed, the name *North West Provinces and Oudh* was changed to the more appropriate one which the United Provinces now bear.

321. Boundaries and extent. The United Provinces are bounded on the east by Bengal, on the south by Central India and Rājputāna, on the west by the Punjab, and on the north by Tibet and Nepāl. Their total length from north-west to south-east is 595 miles, and their width varies from 190 to 350 miles. Their total area is 112,240 square miles, of which 107,164 square miles are British territory. Their total population is about 48½ millions.

322. Physical Features. In the north-west the Province of Agra takes in a portion of the Himālayas. The northern boundary lies beyond the main range, and includes several peaks over 20,000 feet in height, the most notable being **Nanda Devi**. Near the southern base of the mountains is the low range of the **Siwāliks** which enclose the rich elevated valley of Dehra Dūn. At the foot of the mountains is a broad belt of swampy and pestilential jungle known as the **Terai**, which is a favourite haunt of the tiger. Beyond the Terai the plain begins, and extends southwards to the rocky highlands that form the northern buttresses of the Deccan. This plain occupies three-fourths of the province, and consists of rich alluvial soil laid down by the great rivers that intersect it.

323. Rivers. The **Ganges** (§ 223) rises in Garhwāl and the first 600 miles of its course is within the United Provinces. The **Jumna** (§ 224) rises near the Ganges and joins it at Allahābād. Between these two rivers stretches a tract known



Fig. 80. The United Provinces of Agra and Oudh.

as the *Doāb* (*do-āb* two waters). About 150 miles before it reaches Allahābād the Ganges receives the waters of the **Rāmghanga** which also comes down from the Himālayas

Further on the **Gumti** joins it. The **Sarda** and the **Gogra** both rise beyond the snowy range and unite in Oudh. Lower down they are joined by the **Rapti** and 70 miles further to the south-east their united waters join the Ganges. None of these rivers save the Gumti is ever dry, as they are fed by the snows of Tibet. The streams that join the Ganges and Jumna from the south are deep and rapid rivers in the rainy season, but in the dry weather are shallow and sluggish. The **Chambal** drains the Vindhya and the Arāvallis, and unites with the Jumna about 200 miles above Allahābād. Further down the Jumna is joined by the **Betwa** and the **Ken**. Below Allahābād the Ganges receives the **Tons**. The **Sōn** unites with the Ganges in Bihār, and on its way traverses the Mirzāpur district of the Province of Agra.

324. Climate. The United Provinces lie outside the tropics, but, being removed from the moderating influences of the sea, their plains have greater extremes of temperature than the more southerly plains of Bengal. During May and June, before the summer rains begin, very high temperatures are reached, the average annual maximum being 113°F . In the winter the average minimum is 41°F ., and keen frosts are not unknown. The rainfall is naturally heaviest near the hills, along which, however, it decreases rapidly from east to west, owing to the gradual exhaustion of the water-bearing monsoon current which travels up the valley. It decreases still more rapidly from north to south, and all the south-western districts, to which the monsoon currents descend from the highlands of the Deccan, are within the region of precarious rainfall, where drought and famine are only too well known.

325. Natural Productions. The districts north of the Ganges and the Jumna are exceedingly fertile. Wherever it is well watered the alluvial soil is adapted for almost any kind of culture. The rainfall in most parts is ample, and river-water is generally available for irrigation. To the Doāb the Upper and Lower Ganges Canals carry an unfailing supply. (See § 250). One half of the whole area of the province is annually cropped, and many parts yield two crops a year. Food grains are produced in vast quantities. **Wheat** and **rice** are the most important grains grown. In wheat production the United Provinces stand second only to the Punjab. **Barley**, **maize**, various **pulses**, and **millets** are also largely

cultivated. The United Provinces produce more **sugar** and **opium** than all the rest of India put together, and more **cotton** than any province outside the Deccan.

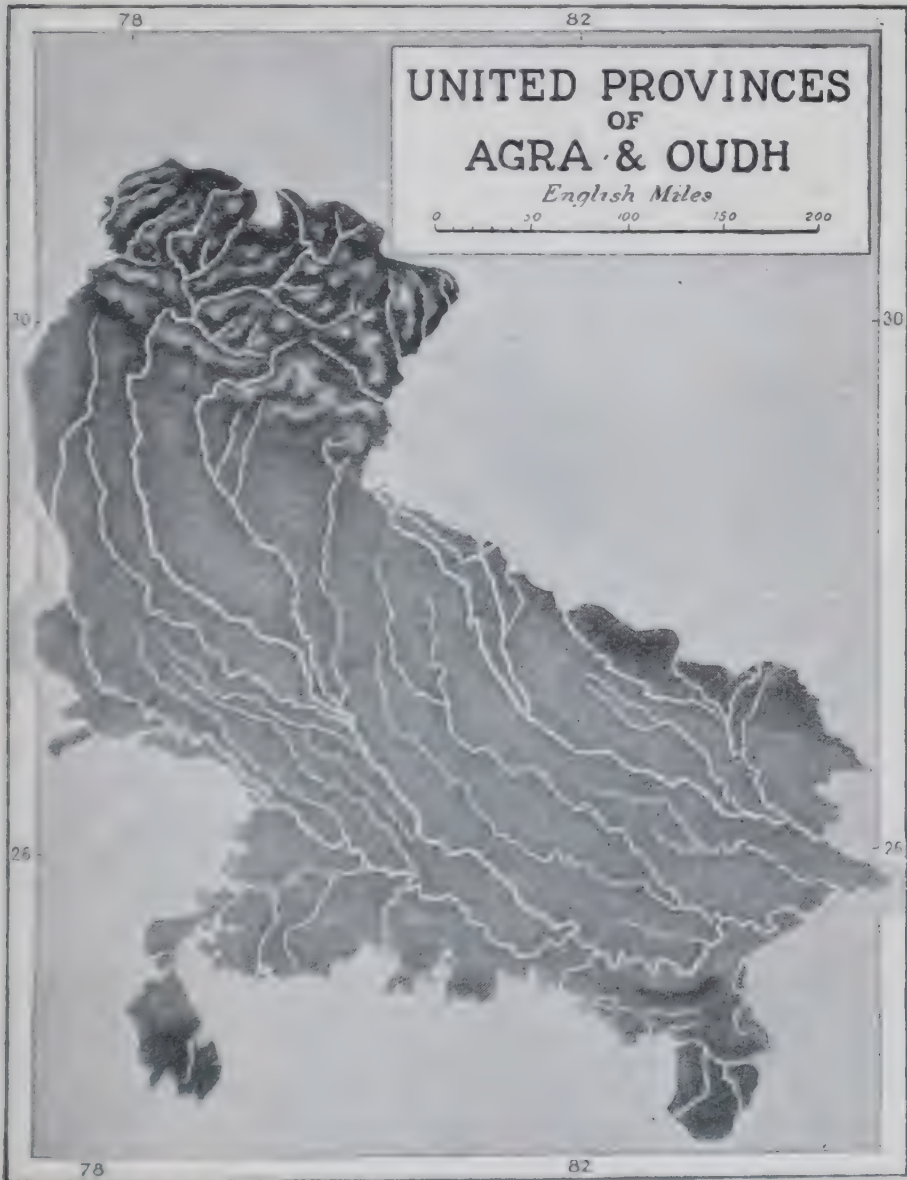


Fig. 81. The United Provinces in relief.

326. People. The people of the United Provinces are of a mixed **Aryan** and **Dravidian** race. About six sevenths are **Hindus** and the rest chiefly **Muhammadians**. **Hindi** and **Urdū**

are the principal languages. Taking the province as a whole there are 440 people to the square mile, which is a little above the density of Bengal. Oudh is, however, more densely peopled than the Province of Agra, having about 530 to the square mile. There is an unusual number of large towns in the province, no fewer than eighteen having over 50,000 inhabitants, and seven over 100,000. This is to be accounted for partly by the fact that the river waterways have for centuries drawn the people together to particular spots for purposes of trade. But still more is it due to the ancient political history of this part of India, many towns having at one time or another been capitals of States.

327. Communications. Much traffic is still carried along the rivers as well as on many of the main irrigation canals. The increase in the railway service has, however, greatly reduced the **through** water traffic, and from some of the canals the small steamers which used to ply have been withdrawn. The province is exceedingly well supplied with railways. The **East Indian Railway** from Calcutta to Delhi runs along the south side of the Ganges as far as Cawnpore, and then crosses the Doāb. From Cawnpore the **Great Indian Peninsula Railway** runs south-west to Jhānsi; the **Bengal and North Western Railway** connects Oudh with northern Bengal; the **North Western Railway** from Delhi serves the northern districts of the province; the **Bombay, Baroda and Central India Railway** runs in from the west to Agra and Cawnpore; and the **Oudh and Rohilkhand Railway** connects the north-western with the eastern systems. These various railways have numerous branches and loop lines in almost every district of the province, and all the larger towns are thus put into communication with the outer world.

328. Chief Towns. Allahābād (172,000), the present capital of the province, is situated at the confluence of the Ganges and the Jumna. It is a great centre of trade and an important railway junction, but it has no large manufactures. The Government of the North West Provinces was transferred from Agra to Allahābād after the Mutiny.

329. Lucknow (264,000), on the Gumti, the capital of Oudh, is a large city with many historical buildings of note. It was the capital of the Kingdom of Oudh for more than a century, and the city grew up round the court. There was a town on

the same site reputed to have been founded by Lakshmān, the brother of Rāma, but the present city dates only from last century. In the history of British India Lucknow is famous for the long defence, and ultimate relief, of the Residency during the Mutiny of 1857.

330. Agra (188,000), on the Jumna, was the capital of the Mughal Empire before the Government was removed to Delhi. It was founded by Akbar in 1560 and contains many very beautiful buildings which date from the time when the Mughal Empire was at its zenith. Near Agra is the Tāj Mahal, the

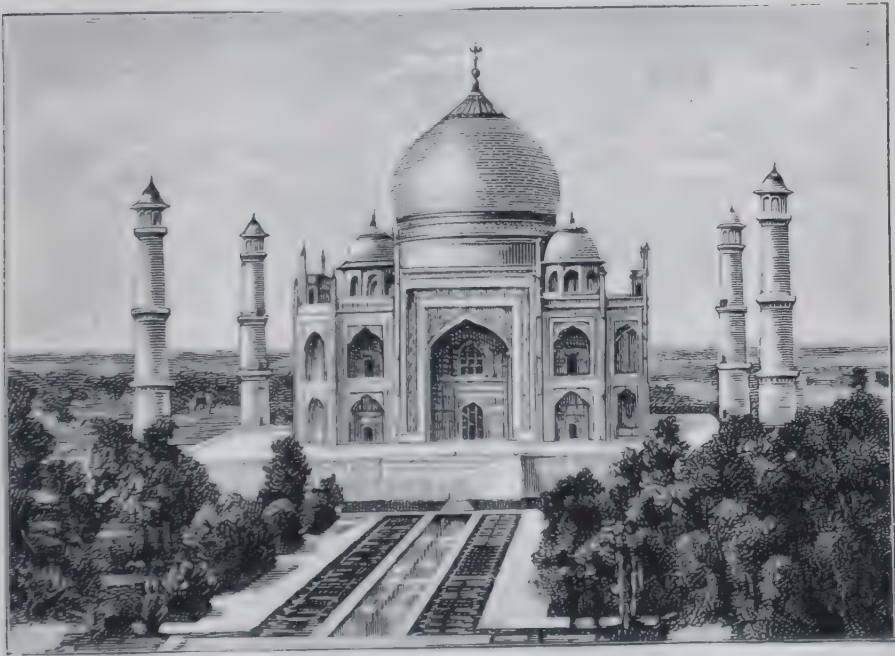


Fig. 82. The Tāj Mahal, Agra.

mausoleum which Shāh Jehān built for his favourite consort, and where he himself also rests. The Tāj is the most exquisite building in India, and in some respects, in the world. **Secundra**, about six miles from Agra, contains the tomb of Akbar. **Fatehpur Sikri**, to the south west, was Akbar's favourite residence.

331. Benares, or **Kāsi** (209,000), the largest city in the Province of Agra, is situated on the Ganges nearly 100 miles below Allahābād. It is a city of stone-built houses, narrow streets, and innumerable temples and ghāts. There is a fine

railway bridge over the Ganges. Aurungzebe pulled down the most sacred temple of the Hindus and built a mosque on its site. The European residents live at **Secrole**, about three miles from the city. Benares is 476 miles from Calcutta by rail. **Ghāzipur**, on the Ganges, east of Benares, is noted for its rose-water, and is also the headquarters of the Government Opium Agency. Lord Cornwallis died here in 1805. **Mirzāpur**, on the Ganges, west of Benares, is a place of some trade, and has important carpet and cotton manufactures.

332. Cawnpore (197,000), on the Ganges, is a prosperous and growing manufacturing town and an important railway junction. The chief manufactures are leather and leather goods (especially saddlery) and cotton fabrics. Blankets and other woollen goods are also made. Cawnpore is notorious as the scene of Nāna Sāhib's massacre. **Bareilly** (131,000) is the chief town in Rohilkhand and a large military station. Rohilkhand is so called from the Rohilla tribe of Afghāns, by whom it was conquered.

333. Meerut (118,000), situated midway between the Ganges and the Jumna, and 140 miles north of Agra, is a large civil and military station. Here the Mutiny broke out in 1857. **Aligarh**, 45 miles north of Agra, is a noted centre of Muhammadan learning. **Sahāranpur**, north of Meerut, is noted for its botanical garden. **Hardwār**, on the Ganges, just where the river debouches on to the plains, is much frequented by pilgrims, and is the site of the great head-works of the Upper Ganges Canal. At **Rūrki**, a modern manufacturing town near Hardwār, are the Canal engineering works, and a famous Engineering College. **Fyzābād**, on the Gogra, was once the capital of Oudh. **Muttra**, north-west of Agra, is a sacred Hindu city. **Jhānsi** is an important railway junction in the south-west.

NATIVE STATES IN THE UNITED PROVINCES

334. RĀMPUR, noted for its cheddars, is a small State in Rohilkhand. It is the last remnant of the once powerful confederacy of Rohilla Afghāns whom Warren Hastings assisted the Nawāb Wazir of Oudh to conquer. The area of Rāmpur is 900 square miles and the population half a million. **Rāmpur** is the residence of the Nawāb.

335. TEHRI (GARHWĀL) is a larger State with an area of over 4,000 square miles. But it is all mountainous, and the population is only a quarter of a million. The Rājā is a Hindu.

THE PUNJAB

336. **Position and boundaries.** As at present constituted the Punjab is bounded on the north by Kashmir and Jammu, on the east by Tibet and the Province of Agra, on the south by Rājputāna and Sind, and on the west by Balūchistān and the North-Western Frontier Province. The total area is

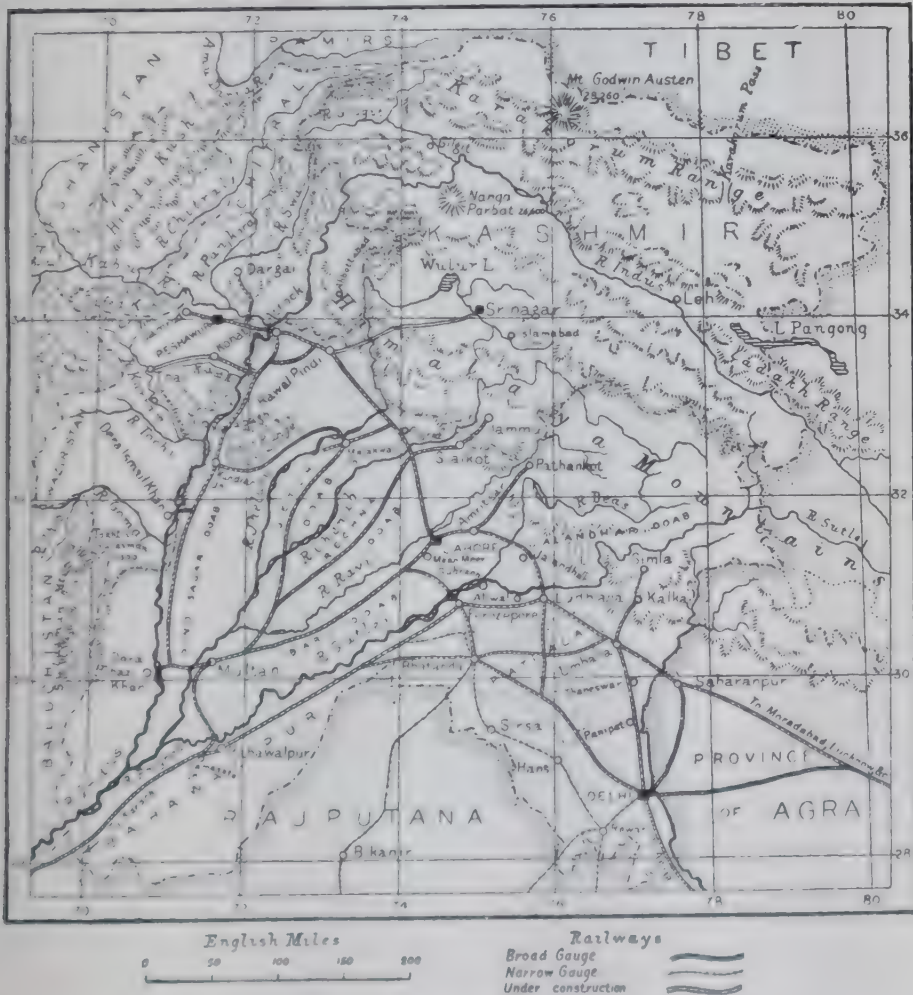


Fig. 83. Punjab, N-W Frontier Province and Kashmir.

133,700 square miles, of which 97,200 square miles are British territory and 36,500 belong to various Protected States. The population of the British territory is $20\frac{1}{2}$ millions and of the Native States $4\frac{1}{2}$ millions.

337. Surface. The north-eastern part of the Punjab is mountainous, being composed of lofty ranges intersected by fertile and beautiful valleys. The north-western corner is cut off from the southern plains by the **Salt Range** which runs from across the Indus near Kālābāgh to the Jhelum. North of the Salt Range is a plateau averaging about 2,000 feet in elevation. The rest of the province is a vast plain except where a long ridge of slight elevation runs northwards from the Arāvallis to Delhi.

338. Rivers. The name Punjab is derived from two Persian words, *panj-ab*, five waters, and originally denoted the country watered by five rivers, **Jhelum, Chenāb, Rāvi, Beās, and Sutlej**, the five great tributaries of the **Indus**. All these rivers, like the Indus itself, take their rise in the Himālayan region; the Indus and the Sutlej beyond the chief snowy range, the others on the southern slopes. As they travel southwards they gradually draw together till they unite near the south-western corner of the province. The Jhelum and the Rāvi pour their waters into the Chenāb. The Beās flows into the Sutlej, and lower down the Sutlej and Chenāb unite to form the **Panjnad** which carries the waters of all five rivers to the Indus. These rivers form five *doābs*. The **Sind Sāgar Doāb**, the largest, is east of the Indus; the **Jetch Doāb** is between the Jhelum and the Chenāb; the **Rechna Doāb** between the Chenāb and the Rāvi; the **Bāri Doāb**, the most populous, between the Rāvi and the Beās-Sutlej; and the **Jālandhar Doāb**, between the Beās and the Sutlej.

339. Climate and Rainfall. Though considerably further north than the United Provinces the Punjab experiences a greater summer heat. In the south-west of the province the thermometer often registers 118°F. in the shade, and 112°F. is common. The winter cold is proportionately severe, keen frosts being frequent. The contrast between summer and winter is not, however, so marked as that between day and night. Owing to the dryness of the air a drop of 60°F. between sunset and midnight is not unusual. These rapid changes are a constant peril, but in spite of them the climate of the Punjab is, for eight months of the year, one of the pleasantest in the world. All over the province the rainfall is scanty, averaging not more than 30 inches a year on the northern mountain slopes, and diminishing rapidly towards the south and west.

where the Native State of Bahāwalpur includes part of the Thār or Indian Desert. The chief rains fall in July, but in the north of the province there is a very regular, though slight, fall in January.

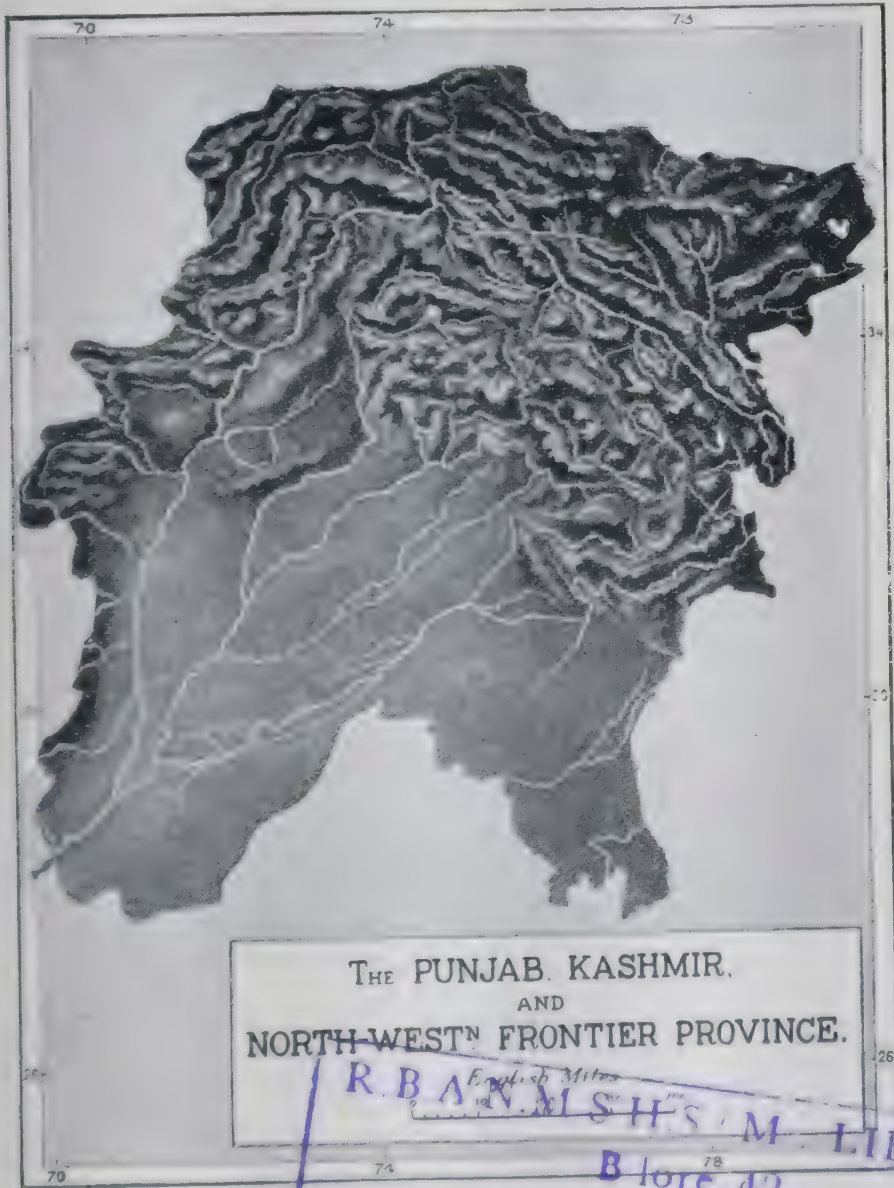


Fig. 84. The Punjab, &c., in relief.

340. Irrigation.

There is a large area of irrigated land in the Punjab than in any other province in India, and the great extension of canal irrigation has changed thousands of

Date;

6.7.81

square miles in the doābs from barren or scrubby wildernesses into richly cultivated tracts. The Government have spent over 8 millions sterling upon irrigation works in this province alone. Over 11,000 square miles are abundantly supplied with water by means of 2,600 miles of main canals and nearly 10,000 miles of smaller distributaries.

341. Natural Products. **Wheat** is the principal food-grain grown, as much land being ordinarily devoted to its culture as to all other food-grains put together. The climate and soil are both suitable, and Punjab wheat is equal to any in the world. Large quantities of it are exported to Europe. Next in importance among the food-grains are **millets**, and **barley**. **Rice** is less extensively grown, as it requires much water. **Gram** and other **pulses** are very widely cultivated, as also are **oil-seeds**, especially **rape** and **mustard**. **Cotton** and **sugar** are widely grown on the irrigated land, and, to a less extent, **tobacco** and **indigo**. **Tea** is cultivated in the Kangra Valley. The **silk worm** is successfully reared in the Mūltān district. Bees are kept in the north and east, and much **honey** and **bees-wax** are produced. The chief mineral product is **salt**. Rock salt is mined at various places in the Salt Range. **Antimony** and **alum** are also obtained from the same hills. Large quantities of **saltpetre** are produced in the plains, where much of the soil is impregnated with it. **Coal** is found near the Jhelum.

342. Communications. The most important railway in the Punjab runs up the Indus Valley giving the province direct connection with Karāchi, its chief seaport. At one time goods had to be taken across the river at Hyderābād by means of a ferry, but now that the river is spanned by the Lansdowne bridge at Sukkur there is through railway connection between Karāchi and the north of the Punjab, *via* Mūltān. From Mūltān branches of the same system radiate up most of the doābs. The North-Western Railway unites Delhi with Umballa, Ludbiāna and Lahore, and is continued beyond Peshāwar in the North Western Frontier Province. From Umballa a line now runs up the hills to Simla, the summer seat of both the Provincial and the Supreme Governments. In spite of the rapid growth of the railway system vast numbers of flat-bottomed boats still ply on the rivers and many of the canals, goods being carried much more cheaply,

if more slowly, by boat than by rail. The *through* steam service on the Indus has, however, been discontinued since the Indus Valley railway was opened.

343. People. The people of the Punjab are of the purest **Aryan** blood in India. They represent the latest wave of Aryan immigrants, who found the country already largely peopled with mixed Aryan races. The chief languages are **Punjabī** and **Urdū**, with **Rājasthānī** in the south-west. In religion the Muhammadans slightly outnumber the Hindus, except in the Native States. There are over two million Sikhs, who are most numerous in the districts around Amritsar.

344. Chief Towns. **Lahore** (203,000), near the Rāvi, the seat of Government was for some time Akbar's capital, and later the capital of the Sikhs. The city contains the tomb of Ranjit Singh, and numerous handsome buildings. It is the seat of the Punjab University. **Mean-Meer**, the military station, is a few miles distant.

345. Delhi (208,000), on the Jumna the largest city in the Punjab, was the capital of the Mughal Empire, and is the most famous of the many historical cities of India. The ruins of old Delhi are a few miles distant. The present city was founded by the Emperor Shāh Jehān, who built both the palace and the fort, as well as the magnificent mosque, the Jumma Masjid. Delhi has always been a great commercial centre, and since the construction of railways it has increased in importance. Six lines radiate from the city and make it the most important railway centre in North India. Delhi has no manufactures of any great moment, but its muslins, and gold and silver work used to be famous.

346. Amritsar (163,000), midway between the Rāvi and the Beās, is the sacred city of the Sikhs. One of the Sikh *gurus* formed a tank here, which he called Amritsar (Pool of Immortality). Amritsar is noted for its manufactures of shawls, silks and cottons. It has long been the chief emporium for the trade with Kashmīr and Tibet. **Govindgārh**, a strong fortress, built by Ranjit Singh, commands the city. From Amritsar a railway runs north-eastward to **Pathānkot**, the nearest railway station to **Dalhousie**, a sanatorium. South-east of Amritsar is **Jālandhar** (68,000), a military station. Northward, **Kangra**, with a famous hill fort, which, under the name of **Nagarkote**, was plundered by Mahmūd of Ghazni.

347. **Umballa** (79,000), between the Sutlej and the Jumna, is a large military station. Northward on the Lower Himālayas, is **Simla**, the summer residence of the Viceroy. South of Umballa, **Thanēswar**, plundered by Mahmūd of Ghaznī. Near this is said to be **Kurukshetra**, the great battle-field of the Mahābhārata. About midway between Umballa and Delhi lies **Pānīpat**, the scene of two great battles.

348 **Siālkot** (58,000), is a military station near the northern frontier. It is on the North-Western Railway, and is the junction for the Jammu branch. **Ludhiāna** (50,000), near the Sutlej, is in Cis-Sutlej territory, and was the principal British north-west frontier station before the first Sikh war. Westward are **Aliwal**, **Sobrāon**, **Firozshāh**, and **Mūdki**, where bloody battles took place between the Sikhs and the British.

349 **Mūltān** (87,000), south-west, near the Chenāb, is a military station and a large manufacturing town. **Attock**, on the Indus at its junction with the Kābul River, guards the principal route across the Indus. Here a railway bridge now spans the river. **Rāwal Pindi** (88,000), between the Jhelum and the Indus, is a large military station. Near the Chenāb is **Gujrāt**, where the Sikhs were finally defeated by the British. **Chiliānwāla**, where a bloody battle was fought with the Sikhs, is in the neighbourhood. Not far from this Alexander the Great defeated Porus, 327 B.C.

NATIVE STATES IN THE PUNJAB

350. There are 34 of these States, but most of them are very small. They have an area of 36,500 square miles, and a population of $4\frac{1}{2}$ millions.

351. **BAHĀWALPUR** stretches south of the Sutlej and the Indus. It has an area of 17,000 square miles, and a population of about $\frac{3}{4}$ of a million. The chief town is **Bahāwalpur**, and the ruler is a Muhammadan Nawāb. With the exception of a small portion of the State watered by canals from the Sutlej and Indus the country is an arid plain.

352. **PATIALA**, a fertile district in Sirhind south of Ludhiāna, is the most important of the protected Sikh States. It has an area of 5,000 square miles and a population of $1\frac{1}{2}$ millions. The chief town is **Patiala**, towards the east. The Mahārājā is a Sikh.

353. **Jind**, **Nābha**, **Kapūrthala**, **Mandi**, and **Farīdkot**, are other Sikh States. **Chamba**, east of Jammu, and **Bussahir**, intersected by the Sutlej, are two of the chief Hill States.

THE NORTH-WESTERN FRONTIER PROVINCE

354. The NORTH-WESTERN FRONTIER PROVINCE is bounded on the east by Kashmīr and the Punjab, on the south by Balūchistān, and on the west by Afghānistān. In the north a narrow tongue of the province stretches along the northern frontier of Kashmīr, and at one place approaches to within 30 miles of the river Amu Daria which forms the Russian frontier. The province stretches from north-east to south-west mainly on the western side of the Indus, and has an area of nearly 16,500 square miles. It was formed towards the close of 1901 in order that the tribal territories along the north-west frontier might be brought under more effective supervision. The trans-Indus districts were taken from the Punjab and together with the neighbouring hill tracts placed under the administration of an Agent to the Viceroy.

355. **Surface.** The country generally slopes gradually from the northern part of the Sulaimān Range and the highlands of Afghānistān on the west to the valley of the Indus on the east. The highest point is the lofty Safed Koh range, which is a spur of the **Hindu Kush** and forms a part of the western boundary. Both at this point and at the extreme north an elevation of nearly 15,000 feet is reached, but the greater part of the province is below 3,000 feet.

356. **Rivers.** The **Kābul River** enters the province from the west after receiving the waters of the **Kunar**, or **Chitrāl River**, which drains the Chitrāl mountains in the north. Further on it is joined by the **Swāt**, with its tributary the **Panjkora**, which also come down from the northern hills. Thirty miles further on it joins the **Indus** near Attock. The **Kuram** rises in the Safed Koh range and flows south-eastwards. Just within the western boundary of the province it receives its chief tributary, the **Tochi**, and empties itself into the Indus a few miles to the south of the Salt Hills of Kohāt. North of these hills a smaller river, the **Kohāt** flows west to the Indus. The **Gomal** rises in the Afghānistān highlands and for about 40 miles forms the boundary between the North-Western Frontier Province and Balūchistān. It joins the Indus south of Dera Ismāil Khān. Along the valleys of all these rivers roads wind into the highlands leading in every case to one of the historic passes between India and Afghānistān.

357. Climate and Products. The rainfall is scanty, particularly in the south. The heat in summer and the cold in winter are both extreme, so also is the variation between day and night. In all these points the conditions prevailing in the Punjab are intensified. The cultivated areas are chiefly along the river valleys, some of which are very fertile. **Wheat** is the chief grain, but **barley**, **maize**, and **pulses** are also grown. The cultivation of **cotton** is spreading. Nearly 1,400 square miles are watered by irrigation canals, chiefly from the Swāt and the Kābul.

358. People and languages. The total population of the province is between two and three millions. Chief among the hill tribes are the **Waziris** in the south, and the **Kohistānis** in the north. The principal languages are **Urdū** and **Punjābī** on the plains, and **Pushtū** in the mountainous country along the west.

359. Towns. The chief town is **Peshāwar**, which lies almost at the foot of the Khaibar Pass, the chief gateway between India and Afghānistān. It is a large military station, and is connected with Rāwal Pindi and Lahore by the North Western Railway. Twenty-five miles east of Peshāwar a branch of this line runs north to **Dargai**. Smaller towns are **Kohāt**, the head of the district of the same name; **Edwardesābād**, on the Kuram River; **Dera Ismāil Khān** commanding the valley of the Gomāl; and **Abbottābād**, in the Hazāra district north of Rāwal Pindi. All these are important trade centres. Through the Kuram valley lies another route from India to Kābul, and in the south, west of Dera Ismāil Khān, is the Gomāl Pass, the chief route to Ghaznī.

KASHMIR

360. KASHMĪR includes the beautiful **Valley of Kashmir**, in the south-west; **Baltistān**, or Little Tibet, in the north; **Ladākh**, in the east; **Chitrāl**, in the north-west; and **Jammu**, in the south. It is a Protected State under the Government of India, and has an area of about 80,000 square miles and a population of nearly 3,000,000, of whom about three-quarters are Muhammadans, a fifth Hindus, and the rest Buddhists and Sikhs.

361. Surface. The Vale of Kashmīr forms a basin surrounded on every side by lofty mountains. At one time it was a vast lake on the course of the Jhelum, of which all but a comparatively small part, the **Wulūr Lake**, has been filled up by the river deposits. The valley has an elevation of 5,250 feet above sea level, and is watered by the Jhelum. The rest of the State is almost entirely composed of rugged mountains intersected by narrow valleys. The **Muztāgh**, or **Kārākorum Mountains** are in the north. They contain many lofty peaks among which are **Mount Godwin Austen** (28,278 feet). The **Kārākorum Pass** crosses the range at a height of 18,300 feet. The **Ladākh Range** runs from north-west to south-east through the centre of Kashmīr. The **Himālayas**, in the south, run in the same direction from the great peak of **Nanga Parbat**, but open out in double folds enclosing the Kashmīr Valley.

362. Rivers. The **Indus** enters Kashmīr from Tibet in the south-east corner, flows in a north-westerly direction for about 350 miles, and then makes its great bend to the south-west rounding Nanga Parbat. Just at its bend it receives the waters of the **Gilgit River** which drains the mountains of Chitrāl in the north-west. The **Jhelum** rises in the hills west of the Vale of Kashmīr, and, like the Indus, takes a north-westerly course, and then, bending to the south, forms for 100 miles the boundary line between Kashmīr and the Punjab. The **Chenāb** enters Kashmīr from the Himālayan districts of the Punjab, and after a winding westerly course for 120 miles, turns to the south, forming the boundary of Jammu, and re-enters the Punjab a little to the north of Siālkot.

363. People. The Kashmiris are chiefly of **Aryan** blood, and are vigorous and hardy, as well as fair and handsome. In the north-east, and throughout Ladākh and the Himālayan hills in the south east, a **Mongolian** element predominates. The languages spoken are various **Aryan** dialects in the west, and **Tibeto-Burman** dialects in the east.

364. Climate and Productions. The Vale of Kashmīr enjoys one of the pleasantest climates in the world, being never very hot, and in the winter months cold and bracing. Jammu, in the south, is much warmer, and is the winter resort of the Mahārājā and his court. Higher up the mountains, and especially in the north west, the cold is intense. The rainfall is scanty everywhere. On the southern hills there are extensive

forests from which timber is obtained, especially **deodar**, and in the valleys **wheat, barley, millets**, and many kinds of **fruit** are grown.

365. Towns. The capital, **Srinagar** (123,000), on the Jhelum, is a flourishing town, beautifully situated in the hill-enclosed Vale. The famous *Kashmīr shawls*, made of the inner hair of the Kashmīr goat, are still made here but the manufacture has declined. There is a growing manufacture of *silk*. *Carpets* are also made. Srinagar is an important junction of trade routes, and a railway is in process of construction which will join the North Western Railway at Rāwal Pindi. **Leh**, the chief town in Ladākh, is near the Indus. It is a point where several trade routes meet, and is one of the highest towns in the world, being over 11,000 feet above sea level. **Gilgit** is a town in the north-west and an important frontier station. **Jammu** lies to the south of the Himālayas, and is connected by rail with Siālkot.

BALUCHISTAN

366. Though outside the boundary of India proper, BALŪCHISTĀN is now a province of the Indian Empire. It is bounded by Sind and the Punjab on the east, Persia on the west, Afghānistān on the north, and the Arabian Sea on the south. Its total area is 132,000 square miles, of which nearly 46,000 is now under British administration.

367. Natural Features. The greater part of Balūchistān is either barren and rocky mountain ridges or flat wind-blown desert. On the eastern and southern sides the mountains run in parallel ranges, on the east from north to south, and along the south from east to west. The southern part of these highlands is called **Makrān**. North of Makrān is the southern portion of the great **Plateau of Irān** which includes most of Balūchistān and Afghānistān. The average elevation is about 3,500 feet. In the north-western portion of Balūchistān there is a large depressed area in the plateau in which the drainage is to inland swamps or salt lakes. It is the first of a series of inland basins which extend northward for 1000 miles and include the Helmand, the Amu Daria and the Syr Daria basins. The highest mountains in the province are in the British districts in the north, and there also the valleys are most fertile. The most easterly of the ridges running south from the Quetta highlands, the **Khīrthar Range**, continues

southwards to Cape Monze and forms the boundary between Balūchistān and Sind. Between the Khīrthars and the Makrān ridges is a triangle of alluvial land, the delta of the Purālī river, which forms the State of **Las Bela**. On the eastern

BALUCHISTAN AND SIND

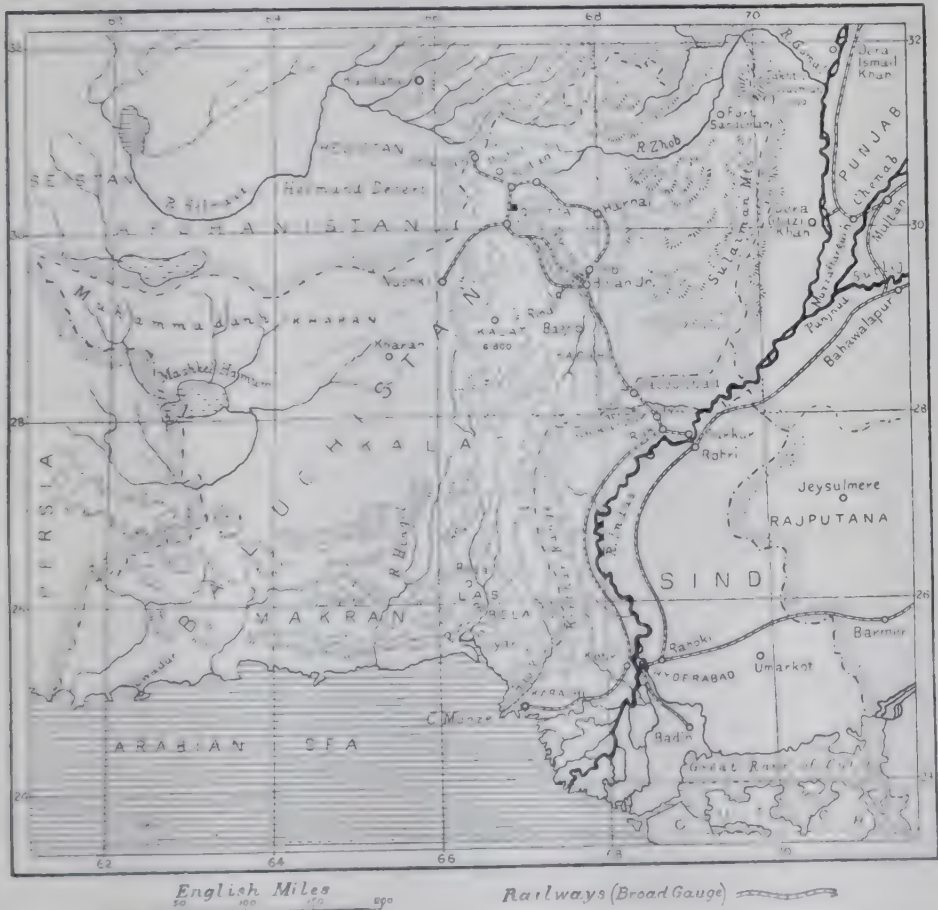


Fig. 85.

frontier there is a low-lying desert stretching north-westwards to the foot of the Quetta hills, and separating the southern Sulaimāns from the hills of Kalāt. This is known as the **Kachhi**, and is traversed by the railway from Jacobābād to Quetta.

368. Climate and Productions. Balūchistān experiences great extremes of temperature. The rainfall is exceedingly scanty everywhere. From the southern Sulaimāns to Las

Bela, and along the coast strip, the average is under 5 inches a year, and it is nowhere over 10 inches save in the neighbourhood of Quetta. The produce is therefore small, cultivation being in most parts impossible; and the population is very sparse, averaging less than 6 to the square mile. In the valleys around Quetta the heavier rainfall is assisted by irrigation, and good crops of **wheat** and **millets** are secured. **Fruit** is also largely grown. Elsewhere there is little cultivation of any kind.

369. People. The total population is only about three-quarters of a million. Nearly half of them are **Brāhuis**, who speak a Dravidian tongue, and are apparently a **Dravidian** race. The remainder are chiefly **Turko-Iranians**, a mixed race. They are divided into many tribes, classed together as **Balochs**, and are chiefly a pastoral people, and very largely nomadic. In religion they are all Muhammadans.

370. **BRITISH BALŪCHISTĀN** includes **Quetta** and the **Bolān**, together with **Sibi**, **Pishīn** and other districts. **Quetta** is united with India by the **Sind-Pishīn Railway**. This line branches off from the **Indus Valley line** near Sukkur and runs up the Kachhi desert tract to Sibi, where it divides. The northern branch goes through the **Nāri Pass** to Harnai and Pishīn, and then bends back to Quetta. The southern branch takes a more direct route through the **Bolān Pass** or the valley of the **Mushkaf**, a few miles to the north. From Quetta the line runs north-west to **Chaman**, and south-west to **Nushki**, both on the frontier of **Afghānistān**. These lines are of immense strategic importance, as they command both the Gomal and Bolān routes to **Afghānistān** and **Persia**. **Quetta** is a trading town of some importance, as it is on the direct route to **Kandahār**, and is now also a strongly fortified military station. It has a pleasant climate for the greater part of the year, being 5,500 feet above sea level.

371. **KALĀT** has successively been under the protection of the Mughal Empire, **Afghānistān**, and the British. The **Khān** exercises a loose authority over nearly 400,000 tribesmen. His chief revenue is from the subsidy, etc., paid him by the Indian Government. **Kalāt**, his capital, is situated in the hills south of Quetta, at a height of 6,800 feet. **LAS BELA** has a population of only 56,000. The prince, styled the **Jām**, is of Arab descent.

RAJPUTANA

372. RĀJPUTĀNĀ lies to the east of Sind and south of the Punjab. It is composed of 20 Native States grouped together for political supervision and placed under an officer styled "Agent to the Governor-General in Rājputānā." The larger of these states, JODHPUR, JAIPUR, UDAIPUR, BIKANER, KOTAH, and ALWAR, are all **Rājput** principalities. Among the smaller states two are **Jāt**, BHARATPUR and DHOLPUR, and one, TONK, is **Muhammadan**. Almost in the centre of Rājputānā are the small British territories of Ajmere and Merwāra.

373. **History.** The Rājputs are of the purest Aryan extraction. At one time they ruled over the greater part of north India, from which they were expelled by the early Muhammadan invaders. They took refuge in the comparatively arid region to which they have given their name, and carved out for themselves principalities which, through many vicissitudes, have survived till to-day. At the close of the Third Marāthā War most of the Rājput Princes entered into subsidiary treaties with the Governor-General of India whereby they came under British protection.

374. **Physical Features.** The **Arāvalli Hills** stretch across Rājputānā in a north-easterly direction, dividing the province into two strongly contrasting parts. The western portion consists chiefly of sandy desert where the rainfall is exceedingly small. Beyond the hills the rainfall is heavier and increases steadily to the east. The south-eastern portion of the province forms part of the **Plateau of Mālwā**, composed largely of *Deccan Trap*, a volcanic rock which forms the rich black cotton soil of the Deccan. The numerous tributaries of the **Chambal**, which drain the northern slopes of the plateau and the eastern slopes of the Arāvallis, are the chief rivers of the province. The **Lūni** drains the western slopes of the Arāvallis, but it is salt, and for half the year dry.

375. **Climate and Products.** The heat is great throughout the whole of Rājputānā and especially so in the west, where the sandy soil is dry and parched. West of the Arāvallis there is little vegetation of any kind, and **millets** are the only crop that can be grown. East of the Arāvallis the summer heat is not so extreme, and as much of the land is rich and well watered,

RAJPUTANA AND CENTRAL INDIA

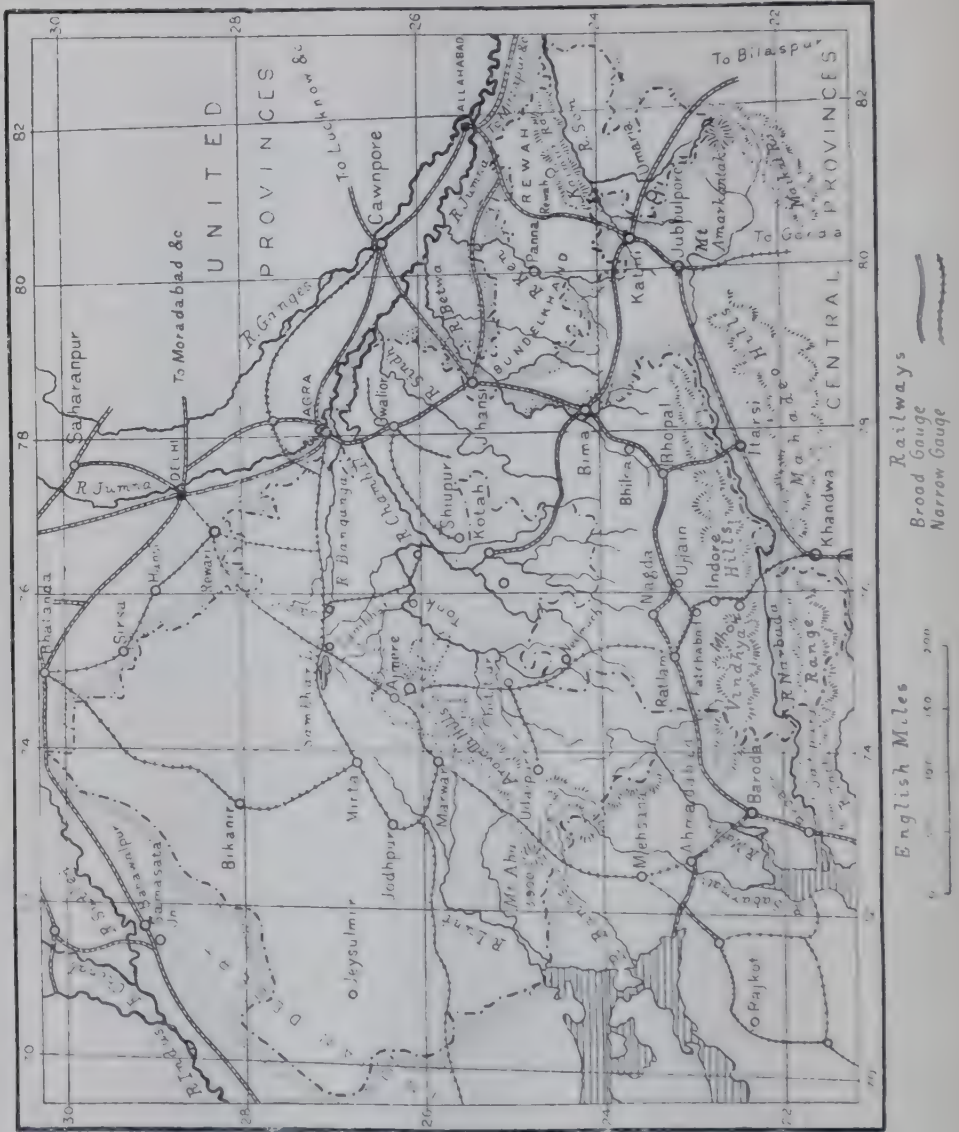


Fig. 86.

agriculture is more flourishing. Millets, pulses, and oilseeds are largely grown, and to a less extent wheat, barley, cotton, and sugar cane. The only mineral product of any moment is salt, which is obtained in enormous quantities from the Sāmbar Lake, a little to the north of Ajmere. There are also important salt pits on the Lūni.

376. Population. Four-fifths of the people are **Hindus** and about a tenth **Muhammadans**. **Jains** are also numerous. The chief languages spoken are *Rājasthānī* and *Hindī*. The population is very sparse west of the *Arāvallis*, and the towns are few. In the eastern part the density is about 200 to the square mile.

377. Railways. Lines from Delhi and Agra unite near Lake *Sāmbhar* and run right through the centre of *Rājputānā* by Ajmere to Baroda, thus giving direct connection with Bombay. Another line gives a connection with *Karāchi* in the west, and from this a branch runs north through *Bikaner* into the Punjab.

378. Chief towns. Most of the towns are strongly built, and many of them are on rocky hills. In olden times they were fortresses of remarkable strength. **Jaipur** (160,000), is the largest city and a place of considerable trade. **Ajmere** (70,000) is the chief town in the small British province of Ajmer-Merwāra. **Nasirābād**, a few miles to the south, is the chief military station in the province. **Udaipur** is the capital of the premier *Rājput* State, and is situated on a rocky ridge overlooking a lake. **Abū** is a settlement on the mountain of that name, and the summer quarters of the *Rājputānā* Government.

CENTRAL INDIA

379. CENTRAL INDIA is composed of a group of Native States which, like those of *Rājputānā*, are united under one political officer styled **Agent to the Governor-General**. The numerous States thus united do not form a natural division in any sense, and are constituted a political unit under the Supreme Government mainly because most of them came under British Protection at the same time. The Agency is divided into two parts by the southern tongue of the Province of Agra which stretches southwards till it meets the northern boundary of the Central Provinces. The western part is the larger. It lies between the Central Provinces and *Rājputānā* and includes the States of **Gwalior**, **Indore** and **Bhopāl**, each of which consists of numerous separate territories. The eastern part includes the State of **Rewah** and the numerous small States of **Bundelkhand**. In all there are 148 Princes and Chiefs included in the Agency, but as 12 of these have no territories Central India consists of 136 States. Most of them are very small.

and many of the lesser States pay tribute to the larger ones. They all came under British protection and control in 1818 after the final overthrow of the Marāthā power. The total area of the Agency is 77,400 square miles, and the population

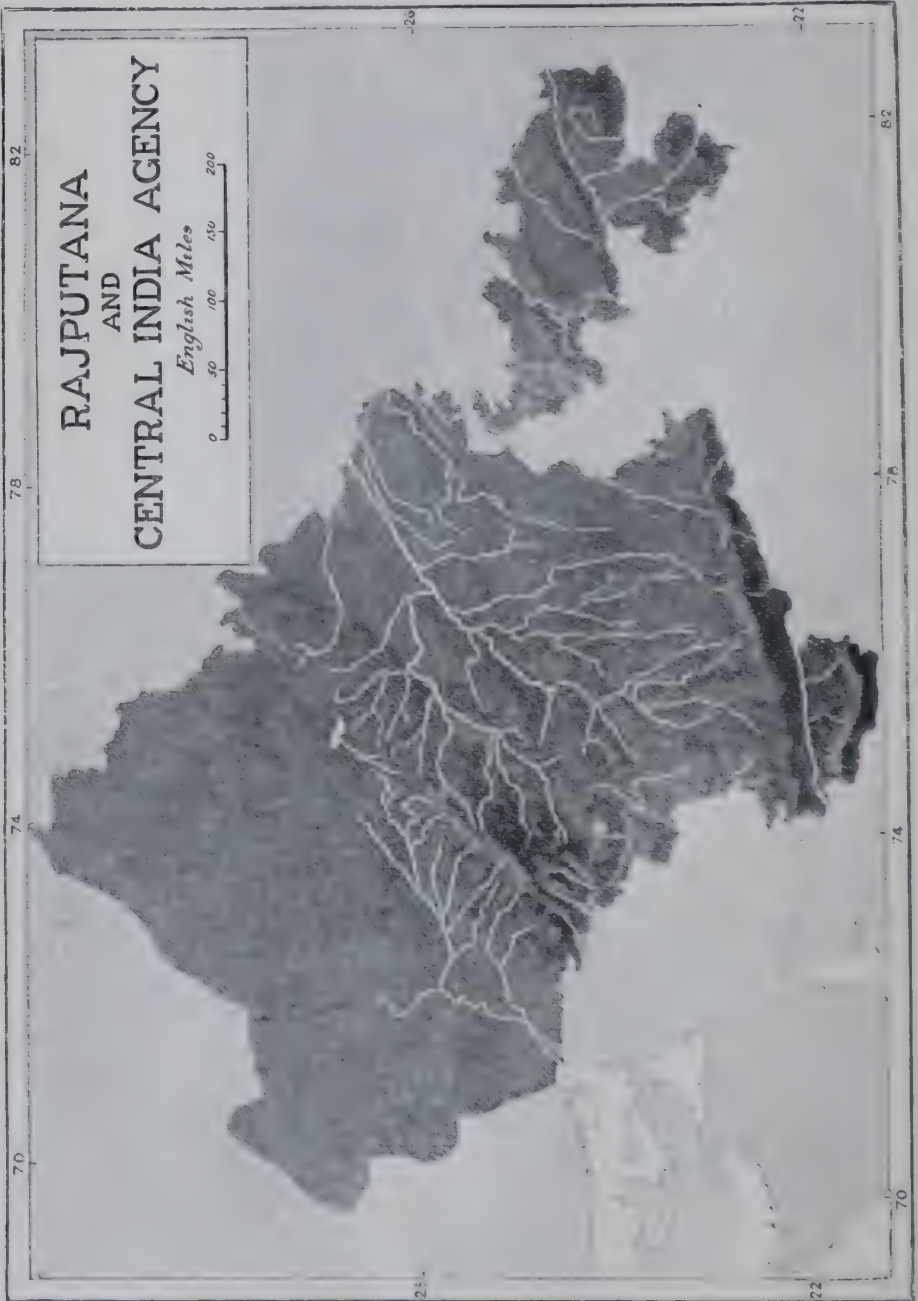


Fig. 87. Rājputānā and Central India in relief.

8½ millions. In race the people are chiefly **Aryo-Dravidians**, though fairly pure Aryans (**Rājputs**), and Dravidians (**Bhils** and **Gonds**) are numerous. **Hindus** number about 7 millions, and the rest are chiefly **Animists**, **Muhammadans** and **Jains**. **Hindi** is the chief language.

380. Surface and soil. The **Sātpurā Range** forms the southern boundary in the west. Northward lies the beautiful valley of the **Narbadā**. The **Vindhya Mountains** run from east to west for a distance of 250 miles. Their southern slopes toward the **Narbadā** are sharp, though the hills themselves are low. North of the **Vindhyas** stretches the fertile **Mālhwā Plateau**, which has an elevation varying from 1,000 to 2,000 feet and slopes gradually to the north so that the entire drainage is to the **Chambal** or the **Jumna**. The **Kāimur Range** crosses the centre of the eastern section, sloping sharply to the valley of the **Sōn** in the south and more gently to the valley of the **Ganges** in the north. In the extreme south of the eastern section the greatest elevation is reached, **Mount Amarkantak**, 3,493 feet in height, being just on the boundary line between Central India and the Central Provinces. The soil of the **Mālhwā** plateau consists chiefly of the rich black cotton soil characteristic of the north-west Deccan, and the hills are composed of abrupt masses of basaltic rock. In the north and east older crystalline rocks and sandstone prevail, which yield a lighter and more porous soil through which the water quickly drains.

381. Climate and rainfall. The rainfall is ample both in the eastern and western sections, especially in the former, and it falls chiefly in the summer months. The monsoon current passes up the valley of the **Narbadā** shedding its moisture as it goes, but giving a heavier watering to **Bundelkhand** than it does to **Mālhwā**. The northern parts around **Gwalior** are much drier than the southern, and are within the region of precarious rainfall. The temperature over the whole of Central India is high in summer, particularly in the north, but in the winter it is cool and pleasant.

382. Rivers. For more than 100 miles the **Narbadā** flows through the south-western portion of the Agency, and for 150 miles further east it forms the boundary between the Agency and the Central Provinces. The tributaries of the **Chambal** are very numerous, and drain the whole of the northern slopes of the **Vindhyas**. The river **Sōn**, which rises on the slopes of

Amarkantak, flows northward to the Kāimur Range which it skirts along the south and so passes into the United Provinces. Bundelkhand is drained by numerous tributaries of the **Jumna** and **Ganges**.

383. Products. On the fertile Mālwā plateau much **opium** is grown, also **tobacco**, **cotton**, **millets**, and **sugar-cane**. **Wheat** is grown in the drier districts, and is chiefly a cold-weather crop. In the south of Rewah **coal** is found, and is successfully worked at Umariā. The largest coal-fields of India stretch south-east from Umariā towards the valley of the Mahānadi, and eastward along the valley of the Dāmodar.

384. Communications. A branch of the **Bengal-Nāgpur** line from Bilāspur to Katni runs through the south-eastern part of the Agency tapping the Umariā coal-fields. Through Katni the **East Indian Railway** from Jubbulpore runs north through Bundelkhand to Allahābād. The **Indian Midland Railway** runs southward to Jhānsi passing the town of Gwalior whence three small branches radiate. The same line runs through the south-west of the Agency connecting all the chief towns. The rivers are of little use as means of communication, being roaring torrents in the rainy season and at other times almost dry. The roads are specially good, more than four-fifths of them being metalled.

385. GWALIOR, a Marāthā State under the Mahārājā Sindhia, is the largest of the Central India States. It includes detached districts between the Chambal and the Narbadā, with an area of 25,000 square miles and a population of about $3\frac{1}{2}$ millions. The capital is **Gwalior**, or **Lashkar**, in the north, with a famous hill fort. In the south is **Ujjain** near which are the ruins of ancient Ujjain, the capital of Mālwā. Ujjain was the first meridian of Hindu geographers, and the year 57 B.C., in which its celebrated king Vikramāditya began his reign, forms a Hindu era. **Bhīlsā**, to the east, on the border of Bhopāl, has some interesting Buddhist remains.

386. INDORE, under the Mahārājā Holkar, is also a Marāthā State, consisting of detached districts on both sides of the Narbadā. Its area is about 9,500 square miles, with a population of 850,000. Bhils are numerous in some of the hilly parts. **Indore**, the capital, lies north of the Vindhya Hills.

387. BHOPĀL, north of the Narbadā is an Afghān State under a Musalmāni Begam. Bhopāl is somewhat smaller than Indore, both in area and population. The capital is **Bhopāl**, near the Betwā, a walled town on a hill 1,700 feet high.

388. **REWAH**, is a Baghel Rājput State in the eastern section of the Agency. It lies south of Allahābād. It has an area of 13,000 square miles and a population of nearly $1\frac{1}{2}$ millions. It is rich in mines and forests. The Ūmariā coal-field is in the south. **Rewah**, the capital, is a town of little moment.

389. **BUNDELKHAND**, the country of the Bundelā Rājputs, lies to the west of Rewah, and is divided among a large number of States and Jāgirs, of which the most extensive are **PANNĀ** and **ORCHHĀ**. **Pannā**, in the east, is noted for its diamonds. The Rājā of Orchhā, in the west, is the head of the Bundelās.

THE CENTRAL PROVINCES AND BERAR

390. The **CENTRAL PROVINCES** are bounded by Bengal and the northern districts of Madras on the east, on the north and north-west by Central India, and on the south and south-west by Hyderābād. They touch the Province of Agra at two points in the north, and the Province of Bombay in the west. The **Narbadā** forms the chief boundary in the north-west, and the **Paingangā**, the **Prānhita** and the **Godāvāri** divide **Berār** and the Central Provinces from Hyderābād in the south. Including **Berār** the total area of the province is over 100,000 square miles, with a population of 12 millions.

391. **History.** At the beginning of last century the greater part of the territories now forming the Central Provinces were included in the dominions of the **Bhonsla Rājā of Nāgpur**. In 1818, at the close of the Third Marāthā War the **Narbadā** and **Sāgar** Districts were taken by the British, and **Berār** was given to the Nizām. In 1853 the Rājā **Raghuji** died without heirs, and the remainder of his territories were annexed. During the Mutiny several petty Native States were seized owing to the disloyalty of their rulers. In 1861 the whole of these territories were made one Government under a Chief Commissioner. In 1853, **Berār** was assigned by the Nizām to the British in order to meet the cost of the Contingent Force maintained for his protection, and for many years was administered by the British Resident at Hyderābād as Chief Commissioner. In 1902 it was leased in perpetuity to the British, and added to the Central Provinces.

392. **Surface and Drainage.** In the north the **Vindhya**s and **Sātpurās** stretch from west to east under many names. The **Mahādeo Hills**, and **Pachmarhi Hills** run south to Jubbulpore.

Further east the **Māikāl Range** ends in the **Amarkantak Plateau** which contains the sources of the Narbadā, the Sōn, the Waingangā, and one of the tributaries of the Mahānadi. South-east is the **Plateau of Chhattisgarh** in which the Mahānadi itself rises, as well as its chief tributary the Seonāth. These

CENTRAL PROVINCES AND BERAR

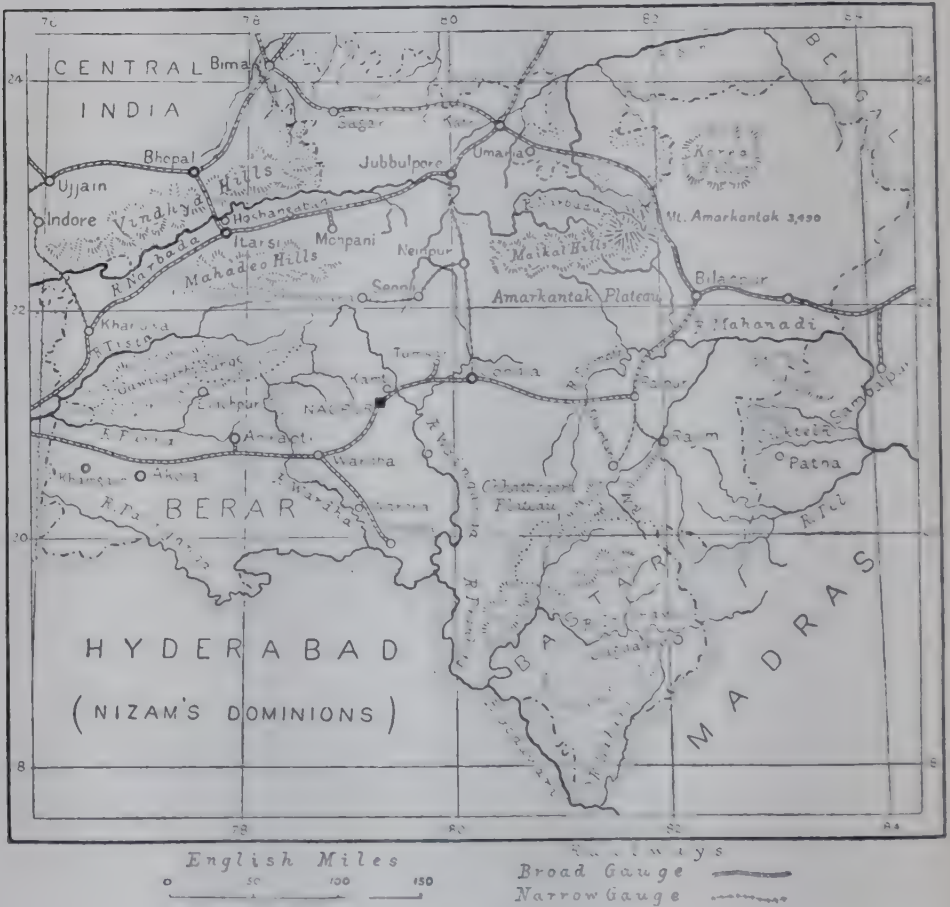


Fig. 88.

both flow at first in a northerly direction and then bend round to the east. South of the Sātpurā Range the country slopes to the south-east, and is drained by the Wardhā and Wain-gangā, which unite to form the Prānhīta, one of the main tributaries of the Godāvari.

393. Climate and Natural Products. The rainfall is ample and seldom fails. The chief rains occur in the summer months

in the west, and in both summer and winter in the east. The western districts, including the whole of Berār, are on the rich cotton-soil, and are very fertile. An immense amount of **cotton** is produced in Berār, almost half the cropped area of the province being devoted to it. **Cholum** and **wheat** are the other chief crops. In the Central Provinces proper cotton takes a subordinate place, only about one-tenth of the cropped area being given up to it. **Rice** is the chief crop, being extensively grown wherever water is plentiful. **Wheat** comes next. The Central Provinces rank third among the wheat-producing provinces of India, both soil and climate in many parts being admirably adapted to it. **Gram** and other **pulses**, and **oil-seeds**, especially **linseed** and **jinjili**, are also largely grown. A large part of the country in the east is wild and unhealthy jungle with few trees of any size. In the north, however, the mountain slopes are clothed with valuable timber. **Lac** is collected in the forests, and efforts have been made to cultivate the lac insect. **Coal** is found in Warorā.

394. **Communications.** The **Bengal-Nāgpur Railway**, providing the shortest route from Calcutta to Bombay, runs right through the province from east to west, meeting the central arm of the **Great Indian Peninsula Railway** at Nāgpur. There are numerous branches north and south. One of the southern branches serves the Warorā coal-field, and another the fertile plateau of Chhattisgarh. Another branch of the Great Indian Peninsula system runs north-west to meet the **East Indian** line at Jubbulpore, whence a branch runs south to meet the Bengal-Nāgpur line. Water-communications are of little value. The rivers are not adapted for navigation, and the chief towns are not found on their banks. The roads are good in the dry season, but only about a quarter of their length is metalled.

395. **People.** The people are of the **Dravidian** stock. About 10 millions are **Hindus**, half a million **Muhammadans**, and the rest chiefly **Animists**. The last are mainly **Gonds**, semi-barbarous tribes who inhabit the hill tracts. The chief languages are **Hindī** and **Marāthī**, with **Uriyā** in the east, and **Gondī** on the hills.

396. **Towns.** Nagpur (1,18,000), the chief town in the Central Provinces, was the capital of the Marāthā Rājā. It is a considerable centre of trade and has rapidly developed since the railway gave it

direct communication with Calcutta and Bombay. The fort is on the **Sītābaldī Ridge**. The cantonment is at **Kāmpṭī**, about 9 miles distant. **Hinganghāt**, south of **Nāgpur**, is a great cotton mart. To the south is **Warorā**, the centre of the mining district. **Jubbulpore** is a well-built trading town, where the East Indian and Peninsula railways unite. It is growing in importance as a railway centre. North-west, **Sāgar**, a military station, on a beautiful lake. **Pachmarhī** is a small hill station on the **Mahādeo Hills**, and the summer seat of



Fig. 89. Central Provinces and Hyderābād in relief.

the Government. The chief town in Berār is **Akola** towards the centre. North-east is **Amrāoti**, a great cotton mart; and northward, **Ellichpur**, once a Muhammadan capital.

397. **Native States.** There are several Protected States in the east of the Central Provinces mostly covered with jungle and inhabited by rude tribes. The largest of them is **BASTĀR**. Its capital, **Jagdalpur**, on the **Indrāvati**, consists chiefly of mud huts.

HYDERABAD

(See Map on page 182.)

398. **HYDERĀBĀD, OF THE NIZĀM'S DOMINIONS**, is bounded on the east by the Central Provinces, west by Bombay, north-east by Berār and the Central Provinces, and south-east by Madras. It is the largest and most important of the Protected States of India. In the north-east the **Paingangā** and **Godāvari** form the boundary, and in the south the **Tungabhadra** and **Kistna**. Some part of the western boundary is formed by the **Sina**, a tributary of the **Kistna**.

399. **Surface.** The whole country forms part of the Deccan Plateau, and has an average height of about 1,300 feet above the sea level. Stretches of greater elevation extend southward from the **Ajanta Hills**, and the **Balaghāt Hills** run east and west between the **Mānjira** and **Godāvari** rivers. The general slope is from north-west to south-east, and the rivers have on the whole an easterly course. The south-west corner of the State is occupied by the **Raichur doāb** between the **Tungabhadra** and the **Kistna**. The area of the State is 82,700 square miles, and the population is over 11 millions.

400. **Rivers.** The **Godāvari** enters the State in the north-west and traverses the northern part in a south-easterly direction, receiving on its left side the **Dudna** and the **Pūrna**, and from the right the **Mānjira** which takes a winding course from its source in the west and passes through the heart of the State. Close to **Sironcha**, on the eastern boundary, the **Prān-hita**, formed by the united waters of the **Paingangā**, the **Wardhā** and the **Waingangā**, joins the **Godāvari**, which from that point forms the boundary to the eastern corner of the State. Below **Sironcha** there is a rocky barrier which prevents navigation, but both above and below this barrier the river forms a useful waterway. The **Kistna** enters the south west of the State

from the Bombay Presidency, and flows at first north-west and then south-east. It is joined on its left bank by the **Bhima**, and by the **Tungabhadra** on its right. The **Mūsi** flows into it from the left about 30 miles before it makes a sharp turn to the south-east into the Madras Presidency. In the east there are a great number of tanks, most of which are used for irrigation purposes.

401. Climate and products. The climate is dry and cool for most of the year, but very hot in early summer. Less than 30 inches of rain a year fall in the west and south, further north the amount is sometimes over 40 inches. A large amount of **cotton** is grown in the north-west where the black cotton soil prevails. **Ragi** and other **millet**s, **oil-seeds**, **rice**, **indigo**, and a little **wheat**, are also grown. Many parts are covered with rocky jungle, but there is little valuable timber. **Coal** is found at Singareni, in the east.

402. People and Language. Though the ruler is a Muhammadan the people are chiefly Hindus, and **Dravidians** by race. Marāthās, of **Scytho-Dravidian** origin, are numerous in the west. **Telugu** in the east, **Marāthī** in the west, and **Kanarese** in the south, are the chief languages.

403. History. At the break-up of the Mughal Empire the Sūbahdār of the Deccan, styled Nizām-ul-mulk (Regulator of the State), declared his independence and established a new dynasty in which the title of Nizām has become hereditary. In 1766 the British entered into an alliance with the Nizām, and, to secure his consent to their occupation of the Northern Circārs, which British forces had recently taken from the French, pledged themselves to support him against either Haidar Ali or the Marāthās. The Nizām strictly observed his treaty engagements, and co-operated with the British in both wars against Tipū Sultān, receiving large slices of territory as his share of the spoil. In 1853 the Nizām assigned Berār to Britain in payment of a large debt, and for the maintenance of the military force called the Nizām's Contingent. For nearly half a century the expenses of the Contingent were paid out of Berār revenues and the balance was handed over to the Nizām. In 1902 Berār was leased to the Indian Government in perpetuity for an annual subsidy of 25 lakhs of rupees. The State of Hyderābād is in direct political relation with the Governor-General, through a Resident at the Nizām's court.

404. Communications. The **Great Indian Peninsula Railway** enters the State from the west, and runs *viâ* Wadi to Raichūr, where it joins the **Madras Railway**. The **Nizām's State Railway** starts from Wadi and runs eastwards to Golconda, Hyderābād and Warangal. Here it bends to the south-east and is continued to Bezwāda where it joins the **East Coast** and **Southern Marāthā** railways. From Dornakal a short branch runs to the Singareni coal-field. The **Hyderābād and Godāvari Railway** runs from Manmād Junction in Bombay, by Aurungābād and Indur, to Secunderābād.

405. Towns. **HYDERĀBĀD**, the capital, is situated on the river Mūsi, a tributary of the Kistna. It is a large city with 448,500 inhabitants among whom are many Arabs and Pathāns. Next to Madras it is the largest city in South India. Its northern suburb, Secunderābād, is the British cantonment. **Bolāram**, a few miles south, is the headquarters of the Nizām's army. **Aurungābād**, in the north-west, is the second town in size. It has a population of about 30,000. Aurungzebe was particularly attached to this city, and here is the tomb of his favourite wife. North of Aurungābād are **Ellora** and **Ajanta**, famous for their sculptured cave-temples. **Jalna**, east of Aurungābād, is a military station.

BOMBAY

406. The Province of Bombay includes a long strip along the west coast of India and the greater part of Sind. It extends through nearly 13° of latitude, from the southern point of the Punjab southward to where the State of Mysore approaches most nearly to the sea. From this point the whole western coast northward to Cape Monze is included in the Province, with the exception of the small Portuguese district of Goa. The Province is bounded on the north by Balūchistān and Rājpūtāna, on the east by the States of Central India and the Nizām's Dominions, south by Mysore, west by the Arabian Sea and Balūchistān. Including the Native States it covers an area of nearly 180,000 square miles, with a population of 25½ millions.

407. Surface. From the river Tāpti the **Western Ghāts**, or **Sahyādri Mountains** run southward at no great distance from the sea. Between the mountain summits and the sea are the districts known as the **Konkān**, including the sharp slopes of the hills and a narrow coastal plain. Inland from the moun-

BOMBAY

(For SIND see Map on page 159).

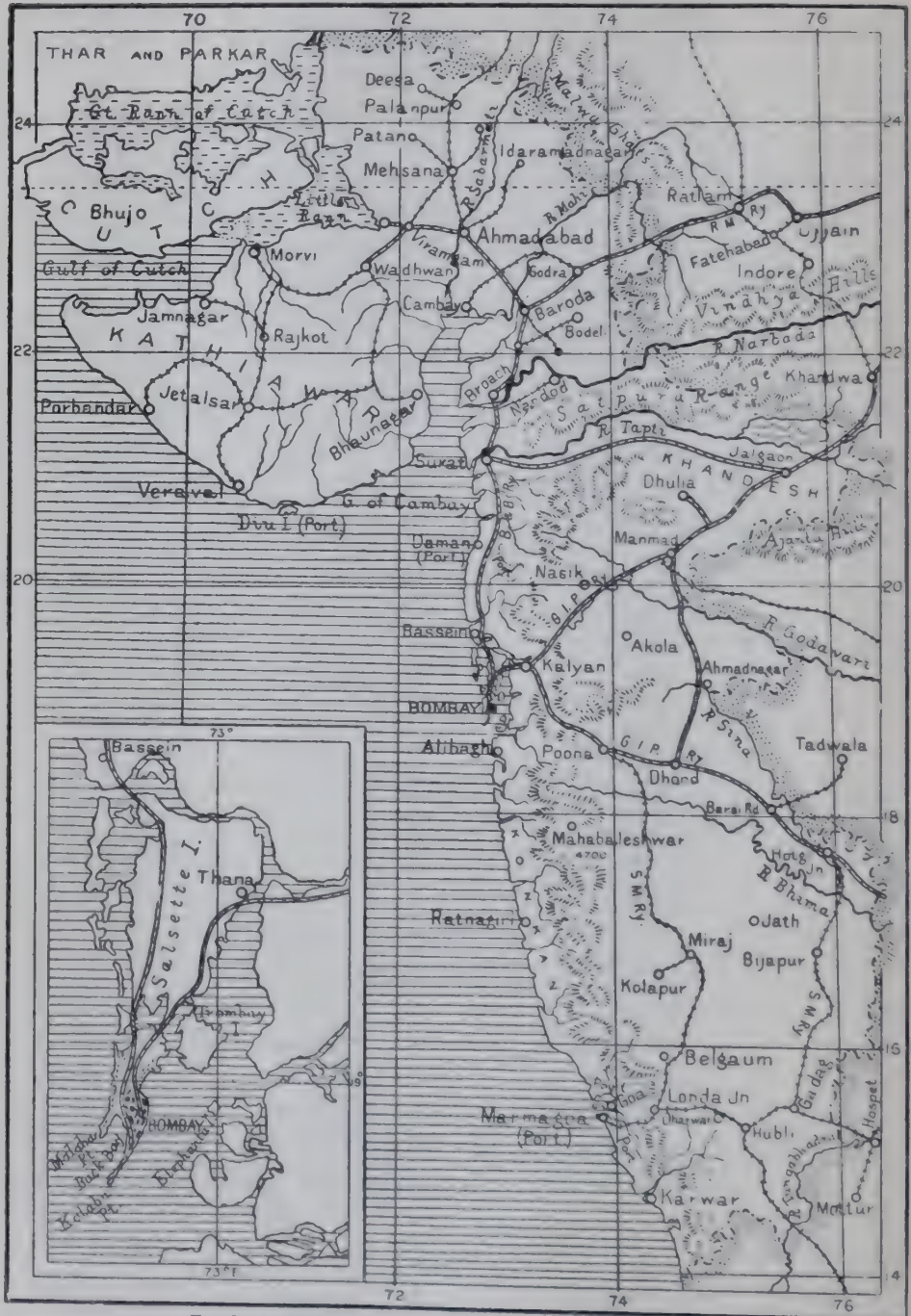


Fig. 90.

tains is the western part of the **Deccan Plateau**, to which the hills slope gently, and which seldom falls to a lower level than 2,000 feet above the sea. The whole of this part of the province is well watered and fertile. On the western slopes of the hills the rainfall is very heavy, but it decreases rapidly to the east, and more slowly to the north. North of the **Tāpti** the province includes the western slopes of the **Sātpurās** and **Vindhya**s, and, stretching northwards, the low **Mālwā Ghāts**, which form the boundary between Bombay and Central India.

408. From these hills the province extends in an almost unbroken plain to the north-west, and the amount of rainfall rapidly declines. Over the great peninsula of **Kāthiāwār** and the districts north of the Gulf of Cambay it is fairly sufficient, being between 20 to 40 inches a year. But **Cutch** and the whole of **Sind** receive much less. The greater part of **Sind** has under 10 inches and a considerable area less than 5 inches. The result of this is that, though much of the soil of **Sind** is naturally good, the province is thinly peopled and comparatively barren. It depends upon the **Indus** for its water, and although all along the course of the river inundation canals carry the flood waters for many miles the greater part of the province is too far from the river to be thus reached. The district of **Thar and Pārkar**, lying north of the great salt swamp called the **Rann of Cutch**, forms the southern portion of the Indian Desert.

409. **Rivers.** The **Indus** flows through **Sind** but receives no tributaries in this part of its course. Its bed is higher than the surrounding plain, and destructive floods sometimes result from the bursting of its banks. The high level of the river, however, makes irrigation by inundation canals easy. The **Sabarmati** and the **Mahī** flow southward from the **Mālwā Ghāts** to the Gulf of Cambay. The **Narbadā** runs but a short part of its course through Bombay. It has a broad sandy estuary. The **Tāpti** flows through the province for the last 200 miles of its course, watering the broad low plateau of **Khāndesh**. In the southern portion of the province the rivers flowing to the west are short and swift. On the east the basins of the **Godāvari** and **Kistna** extend from the **Tāpti** basin to the extreme south of the province. The **Sina** and the **Bhima**, both of which rise in the **Western Ghāts**, are the chief tributaries of the **Kistna**.

410. Climate and Products. The abundant rainfall in the south of the province keeps the temperature fairly even. In the Konkān it is warm and moist almost all the year, oppressive in the hotter months but pleasant in the winter. At the other side of the hills the difference between the winter and summer temperatures is greater, and in the Deccan districts the winter is pleasant and healthy. As the rainfall decreases towards the north-west the variation between summer and winter, and between day and night, increases. In Sind the difference is very great. The summer days are intolerably hot, the thermometer in the shade sometimes rising to 125°F. , and the winter nights are intensely cold. There is often a drop of 50° between day and night. In Sind the soil is mostly sandy. From the Mālhwā Ghāts southward (including most of Kāthiāwār), the rich black cotton soil predominates, the whole of the north-western Deccan being upon the dark volcanic rock called **Deccan Trap**. **Cotton** is grown in abundance, particularly in the northern district of Khāndesh and the southern district of Dhārwar, as well as through the whole of the districts and States around the Gulf of Cambay. **Rice** is grown in the wet districts along the coast, where the **coconut** also abounds. **Wheat** is the chief crop in the drier districts of Sind. The **millets** and **pulses** are largely grown east of the Ghāts. Bombay has no mineral wealth.

411. Communications. Two arms of the **Great Indian Peninsula Railway** run from the city of Bombay, one north-east to Manmād and Jubbulpore, crossing the hills at the Thāl Ghāt, and the other south-east to Poona and Raichūr crossing them at the Bōr Ghāt. A loop line from Manmād to Dhond, passing the ancient city of Ahmadnagar, unites these two arms. The southern part of the province is served by the **Southern Marāthā Railway**, of which two lines run south from the Great Indian Peninsula line, one from Poona and the other from Hotgi. These are united in the south by a line of the same system running from Goa eastward to Guntakul and Bezwāda, and south-eastward to the Mysore State. Northward from Bombay the **Bombay and Baroda Railway** runs along the coast, *via* Surat and Broach, to Baroda and Ahmadābād. From Surat the **Tāpti Valley line** unites this with the northern arm of the Great Indian Peninsula Railway at Jālgāon. There are numerous small lines in Kāthiāwār which



Fig. 91. Bombay in relief.

are linked up with the Rāiputānā-Mālwā Railway running through Rāiputānā to Agra and Delhi. The Indus Valley line of the North-Western system runs along the left bank of the

river as far south as Rohri, and then crossing the river at the Sukkur Bridge continues on both banks as far as Hyderābād, then on the right bank alone to Karāchi. From near the Sukkur Bridge the **Sind-Pishin Railway** branches off to Quetta and the Afghān frontier. The province is well supplied with roads, but of inland waterways it has few save the Indus.

412. People. The inhabitants of the province are chiefly of **Scytho-Dravidian** race. In Bombay proper **Hindus** very greatly predominate, in Sind, **Muhammadans**. There are nearly a quarter of a million **Jains** in the province, also about 75,000 **Pārsis** who were driven from Persia by the Muhammadan invasions in the 7th century. They form the most active and energetic business men in the city of Bombay. **Sindhi** in the north-west, **Gujarāthi** round the Gulf of Cambay, and **Marāthi** to the south are the chief languages. As in all other provinces of India agriculture is the main occupation of the people, but the city and neighbourhood of Bombay has become a great manufacturing centre. There are many large **cotton mills**, and the export of Indian-made cottons is steadily increasing, especially to Hong-Kong and the Straits Settlements.

413. History. The Island of Bombay formed part of the dowry of Catherine of Braganza, wife of Charles II., and was given by him to the East India Company in 1688. In 1782 the neighbouring islands were obtained from the Marāthā ruler. The Districts along the shores of the Gulf of Cambay were secured after the First Marāthā War, and all the southern Districts (save North Kanara, received later from Madras) fell to the British on the downfall of the Peshwā's power in 1818. Sind was conquered in 1843.

414. BOMBAY (770,000), situated on a small island now united with the mainland, is the second largest city in India, and has the finest harbour. Its safe and excellent accommodation for shipping, and the fact that, save Karāchi, it is the nearest Indian port to Europe give Bombay a great advantage over any other Indian seaport, especially now that the Ghāts, which in olden days cut it off from the interior, have been surmounted by railways. Bombay is now a wealthy and exceedingly handsome city, some of its public buildings being equalled by no others in India. It is a great centre of commerce and manufacture, and the chief cotton

port. Bombay is about 1,400 miles from Calcutta by rail, and about 800 from Madras. **Elephanta**, a small island in Bombay harbour, and **Salsette**, to the north, contain sculptured cave-temples.

415. **Ahmadābād**, on the Sābarmatī, was once the Muhammadan capital of Gujarāt and is the third city in the Bombay Presidency. **Broach**, on the Nārbadā, is an ancient seaport and still has a considerable cotton trade. At **Surat**, on the Tāpti, the first English factory in India was established in 1612. **Nāsik** is a place of pilgrimage near the source of the Godāvari. There are some cave-

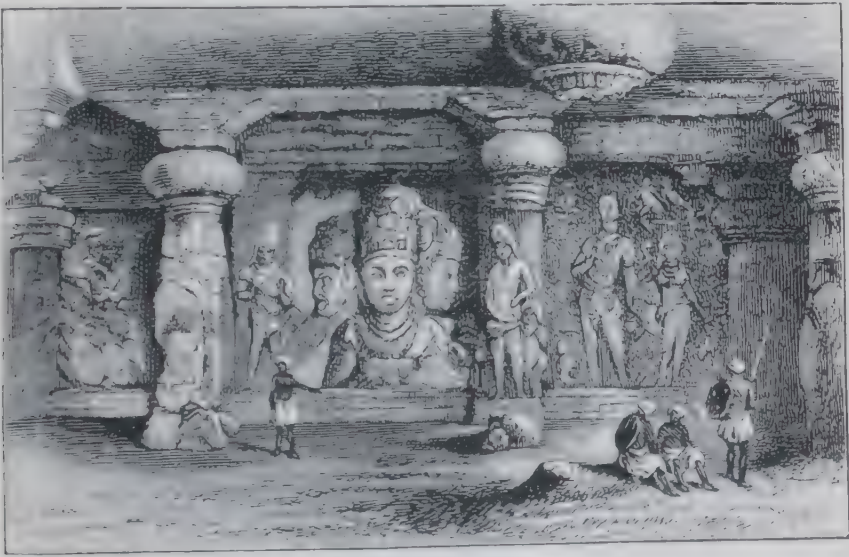


Fig. 92. Sculptured Cave Temple, Island of Elephanta.

temples, of Buddhist origin, in the neighbourhood. **Ahmadnagar**, on the Sina, was once the capital of a Muhammadan kingdom. **Poona** is a large military station, and was the last capital of the Peshwā. South west is **Mahābaleshwar**, a sanatorium 4,700 feet above sea-level.

416. **Dhārwar** is noted for its cotton, and is connected by rail with Bellary. **Hubli**, near Dhārwar, has a large cotton trade. **Karāchi** is a seaport west of the Indus with a good harbour and a rapidly growing trade. It has railway connection with North India, and is the chief port for the Punjab. Almost all the Indian export of wheat is from this port. **Karāchi** is the largest town in Sind. **Hyderābād**, near the Indus, was formerly the capital of the Amirs of Sind. **Kārwar**, south of Goa, has a safe and good harbour, but having no railway communication with the interior its trade is declining.

NATIVE STATES IN BOMBAY

417. Bombay has a large number of Protected States, but many of them are very small. Including **BARODA**, which is under the Supreme Government, their total area is about 70,000 square miles and their population about $10\frac{1}{2}$ millions. **KHAIRPUR** is in the north-east of Sind. Chief town, **Khairpur**, not far from the Indus. **CUTCH** is a long semi-circular peninsula to the north of the Gulf of Cutch, separated from Sind by the Great Rann. The inhabitants are Musalmāns and Hindus in about equal proportions. The head of the Government is called the Rao, under whom there are about 200 Chiefs. The principal town is Bhūj, near the centre. The **GUJARAT STATES** lie around the Gulf of Cambay, beyond British territory. **BARODA**, under the Gaikwār, is the most important. The chief towns in the Gaikwār's dominions are **Baroda**, the capital, east of the Gulf of Cambay, and **Deesa**, a military station, in the north. The peninsula of Kāthiāwār contains a large number of small States, and there are others in the Deccan.

MADRAS

418. The Province of Madras includes the southern portion of peninsular India, and takes in the entire coast southward from Lake Chilka on the east, round Cape Comorin, and northward on the west to the southern boundary of Bombay. Its total area, including the Native States, is 151,700 square miles, and its population over $42\frac{1}{2}$ millions.

419. History. In extent and boundaries Madras has changed but little since 1801. The sandy low-lying tract upon which the city of Madras now stands was obtained from the Rājā of Chandragiri in 1639, but for nearly a century and a quarter was closely hemmed in by native territory. In 1703 the surrounding district of **Chingleput**, then called the *Jāgīr*, was ceded by the Nawāb of Arcot. Two years later the **Northern Circārs**, including the coast Districts between Nellore and Orissa which had been taken from the French in 1759, were formally ceded to the British by the Emperor. In 1792, after the first war with Tipū (known as the Third Mysore War) the Districts of **Malabar** and **Salem** were taken. The Fourth Mysore War ended in 1799 with the fall of Seringapatam and the death of Tipū, and was followed by the partition of his

territories. The British took the southern and western portions, which now form the Districts of **Coimbatore** and **South Kanara**, and the Nizām took an extensive tract in the north bordering on his own dominions. The rest was restored to its old Hindu rulers whom Haidar had dispossessed. At the same time the Rājā of the small Marāthā Kingdom of **Tanjore** yielded his territories to the British in consideration of a pension. The following year the Nizām entered into a subsidiary treaty with the British, ceding to them his recent acquisitions. Thus the greater part of the present Districts of **Bellary**, **Anantapur**, **Kurnūl** and **Cuddapah** became British territory, and for long continued to be called the **Ceded Districts**. For some years previous to this the Nawāb of Arcot had resided in the city of Madras under British protection, leaving the administration of his territories to the officers of the Company. In 1801 these territories were formally annexed to the Presidency of Madras, which thus became very much what it is to-day.

420. Surface. Madras takes in almost the whole of the **Eastern Ghāts** and a considerable portion of the interior plateau. In the south it includes the higher hills where the Eastern and Western Ghāts draw together, and the Pālghāt Gap which gives easy communication between the eastern and western parts of the province. North of the Gap are the **Nilgiris**, whose highest peak, **Dodabetta**, attains a height of 8,760 feet, and is exceeded only by **Anamudi** in the **Anamalais**, south of the Gap, which reaches 8,850 feet, and is the most elevated point south of the Sulaimāns. The **Shevaroy Hills** are a detached group south west of Madras, which may be regarded as the southern spurs of the Eastern Ghāts. They are separated from the western spurs of the Nilgiris by the valley of the Cauvery. The **Palnis** are a long eastern spur of the Anamalais. From the Anamalais the **Cardamom Hills** run south almost to Cape Comorin, forming the boundary between the Native State of Travancore on the west and the British Districts on the east. The Eastern Ghāts are known by different names in different parts, the chief being the **Nallamalai Hills**, south of the bend of the Kistna. None of them are over 4,000 feet in height till north of the Godāvari, when they approach considerably nearer the sea, and in several places rise to nearly 5,000 feet.

MADRAS, HYDERABAD, AND MYSORE

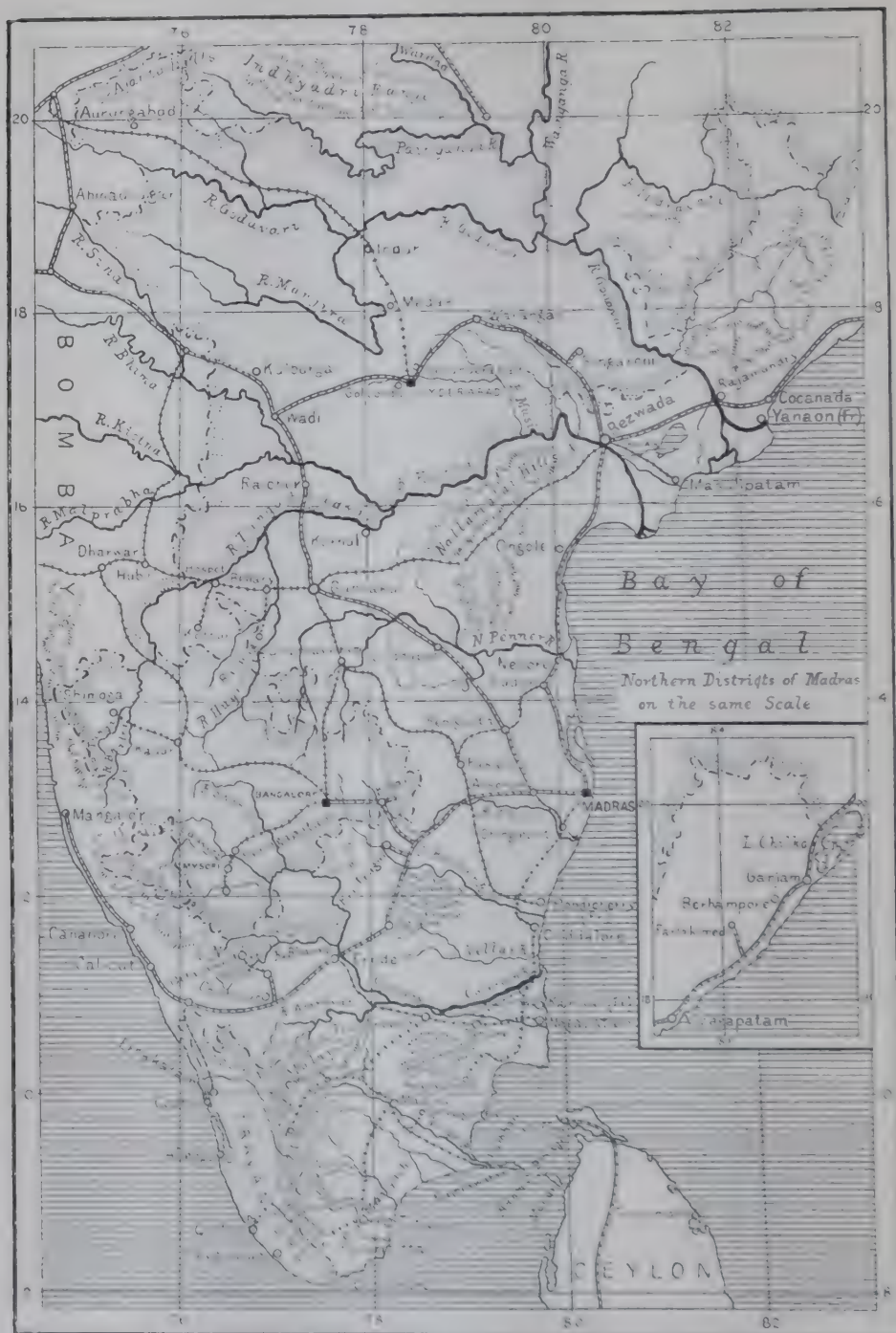


Fig. 93.

421. Rivers. The **Godāvāri** and **Kistna** (p. 104) flow through Madras for only the last few miles of their course, but they bring down an immense volume of water, and are of great importance. The **Cauvery** runs the greater part of its course in Madras. It rises on the plateau, and by its numerous tributaries drains the southern half of the Mysore State. After descending to the plains it receives the **Bhavāni** and the **Noyil** from the Nīlgiris and the **Amarāvati** from the Palnis. At Trichinopoly its delta begins, the river dividing into two main channels, the larger of which is called the **Coleroon**. Smaller rivers are the **Northern Penner**, which drains by its numerous tributaries the northern part of the Mysore plateau and enters the Bay of Bengal at Nellore, the **Pālār** and the **Southern Penner**, which also come down from the plateau and discharge into the Bay near Sadras and Cuddalore respectively, the **Vellār** a little further south, and the **Vaigai**, the **Vaipar** and the **Tāmbraparni** which rise in the southern mountains and flow into the Palk Straits and the Gulf of Manār.

422. Climate and Rainfall. The temperature is fairly high all the year round. The day temperature along the coast varies from 75° to 95°F. and the difference between day and night is very slight. In the interior both daily and seasonal ranges are greater. The west coast is not so hot in summer as the east on account of the heavy rains which then fall. The south-west winds, which bring refreshment to the west of the peninsula reach the eastern districts as hot and dry land winds. The east coast receives its chief watering in October and November when the north-east monsoon sets in. Along both coasts the rainfall is usually plentiful. The western districts, however, owing to the influence of the Ghāts, receive a much heavier fall than the eastern, the annual average being 130 inches against 50 inches on the east. Inland the fall is much less, and more precarious, and in the northern districts, on the plateau, it is very scanty, varying from 17 inches in Anantapur to 30 in Cuddapah.

423. Soil and Irrigation. The rich, black, water-holding soil known as cotton soil, is not largely met with in Madras. Almost the entire province, as well as Mysore, the south-east of Hydrābād, and a large part of the Central Provinces, is a region of ancient crystalline rock. The soil is therefore sandy and porous, and except along the alluvial coast strip the rainfall

quickly drains away. This makes the rivers exceedingly liable to floods. Their waters rise and fall with extreme rapidity, and the land is soon dry after the heaviest rain. There is almost everywhere, therefore, a constant need for irrigation. Vast systems of canals distribute the waters of the Godāvāri, Kistna, Cauvery, and North Penner over their deltas. More than 7,000 miles of canals, large and small, thus water 5,000 square miles of land, converting tracts once dry and barren into rich and fertile rice fields. Still more important, however, is the irrigation carried on from storage tanks. There are over 60,000 artificial tanks in the province, varying in size from mere ponds to vast lakes. In some cases the smaller rivers hardly find their way to the sea at all, their flood-waters being run off into tanks along their whole course. Irrigation from wells is also of great importance and is common all through the province.

424. Natural Products. Rice is grown in the river deltas, along the coastal strip, and wherever water is plentiful. Tanjore is the greatest rice-producing district in South India. In the drier districts the **millets**, especially **cholum** and **cumba**, are very largely grown, as also are **pulses**. Millets and pulses usually cover twice as much land as rice. **Oil-seeds** and **sugar cane** are also grown. **Cotton** is a crop of increasing value. Only Berār and Bombay exceed Madras in the amount of cotton produced. **Indigo** was at one time a crop of great importance, but it now covers a comparatively small area. **Tobacco** is largely grown in Madura and the Godāvāri Delta, the produce of the latter being known as Lanka tobacco. **Coffee** and **tea**, and, to a small extent, **cinchona**, are grown on the Nilgiris and the Western Ghāts. The **coconut** is common everywhere along the coast. The province has no great mineral wealth. **Iron** of great purity is abundant near Salem and in many other parts, but owing to the scarcity of fuel and lime it cannot be successfully worked on any large scale. **Salt** is obtained in large quantities from sea-water by solar evaporation.

425. People and Industries. The population of the province is almost entirely **Dravidian**. **Telugu** is spoken in the north-east, **Tamil** in the south-east, **Kanarese** in the north-west, and **Malayālam** in the south-west. There are a few primitive tribes on the hills who also speak Dravidian dialects. **Tulu** is a cultivated language of the same family spoken in South



Fig. 94. Madras, Mysore, Hyderābād and Berār in relief.

Kanara. Most of the people are **Hindus**; about two-and-a-half millions are **Muhammadans**, and two millions **Christians**. Education is more widespread in Madras than in any other province of the Empire save Burma. More than two-thirds of the people are directly engaged in agriculture. There are no great manufactures, but the ordinary hand manufactures, pottery, weaving, brass work, etc., are common in most parts. The Northern Circārs used to be famed for their fine muslins, but the manufacture has declined. Tanjore and Trichinopoly produce ornamental gold and silver work. Trichinopoly is noted for cheroots and cigars, and, owing to a European demand for Indian cigars which has sprung up of recent years, this industry has largely developed.

426. **Communications.** Madras is well supplied with roads, and, owing to the ease with which stone is obtained, more than three-fourths of their entire length is metalled. The province contains almost as great a length of metalled road as all the other Indian provinces put together. Its river waterways are of little importance owing to the variable volume of the rivers. In the dry weather most of them shrink to mere rivulets meandering over wide beds of sand, while in the rainy season they are rushing torrents which carry all before them. Wherever the waters are held up by anicats there is a certain amount of boat-traffic, and small steamers have been tried, though without much success, on the Godāvāri. The **Buckingham Canal** runs along the east coast uniting the Godāvāri and the Pālār and brings large quantities of produce from both north and south to Madras.

427. Three lines of railway branch from Madras. The **East Coast Railway** runs north to Calcutta, meeting at Bezwāda the **Southern Marāthā** line which crosses the peninsula from Goa, and the **Nizām's State Railway** from Warangal and Hyderābād. The **Madras Railway** runs inland, and at Arconum divides into northern and southern arms. The former runs in a north-westerly direction crossing the Southern Marāthā line at Guntakul and uniting with the **Great Indian Peninsula** at Raichūr. This is the mail-route between Madras and Bombay. The southern arm runs south-west through the Pālghāt Gap to the west coast, and then northward to Mangalore. From Jalārpet a branch runs north-west to Bangalore, from Podanūr another to Mettapolliam at the foot of the

Nilgiris whence a hill-railway ascends to Ootacamund, and from Shoranur, beyond the Gap a narrow-gauge line runs south to Cochin. The **South Indian Railway** runs from Madras to Tuticorin, forming, in conjunction with daily steamers across the Gulf of Manār to Colombo, the chief line of communication between India and Ceylon. A branch of this line runs to the French town of Pondicherry, and in the opposite direction northwards to Dharmavaram, where it unites with the Southern Marāthā system. Other branches run from Tanjore to Negapatam on the coast and from Trichinopoly to Erode on the Madras line. From Madura a branch follows the course of the Vaigai river to Mandapam on the Pāmban Passage, and further south a recently constructed branch runs westward from Manyāchi, and, crossing the Cardamom Hills, puts Quilon on the west coast into communication with the towns in the east. The East Coast and Madras Railways are standard-gauge lines: the South Indian, like the Southern Marāthā, is of the metre-gauge.

428. Foreign Commerce. Although the Province of Madras has a long sea-board and a large number of minor ports, its foreign commerce is small, amounting to only about 9 per cent. of the total foreign trade of India. One of the chief reasons of this is the fact that the ports are all poor. None of them give any shelter for vessels in bad weather, and at many of them the sea is so shallow that vessels have to anchor a long way out. The larger ocean-going steamers, therefore, touch at no port along the coast save Madras itself, and only a few of them there. Further, Madras has no great manufactures, or large staple produce, which it seeks to sell, so that however good the ports were their trade could not be large. The **exports** consist chiefly of hides, cotton, indigo, rice, oilseeds, and sugar; and the **imports** of cotton fabrics, metals, machinery, spices and liquors.

429. Towns. MADRAS (510,000), the capital of the Presidency and the largest city in South India, is situated on a low sandy coast. It is defended by Fort St. George, from which the Presidency derives its official name. A harbour has been constructed at great cost, but it gives no shelter in bad weather, and the port has only about 5 per cent. of the sea-borne trade of India. Madras is 770 miles from Calcutta by sea and nearly 800 miles from Bombay by rail.

430. Other seaports are **Vizagapatam**, **Cocanāda**, and **Masulipatam**, north of Madras, and **Negapatam**, south of Madras, all on the east coast. There are many other smaller ports, but they are all alike in offering no shelter whatever to shipping. Cocanāda, near the northern mouth of the Godāvari, is connected with the East Coast Railway by a short branch-line. Its population and trade are rapidly growing. Masulipatam was the first English settlement on the east coast, and dates from 1620. From Negapatam large quantities of rice are shipped to Ceylon. From **Tuticorin**, on the Gulf of Manār, the cotton grown in the southern districts is mostly shipped. But the chief trade of the port is with Colombo by a steamer which runs daily in connection with the South Indian Railway service. **Calicut**, on the west coast, was the first place in India visited by the Portuguese under Vasco da Gama.



Fig. 95. Trichinopoly Rock.

431. Among inland towns, **Trichinopoly**, at the head of the delta of the Cauvery, is a military station and the second city in the Presidency. It is noted for its cheroots and jewellery. **Srīrangam**, on an island of the Cauvery, near Trichinopoly, contains the largest temple in India. **Madura**, on the Vaigai, an ancient city with some large temples, was once the capital of the Pāndyan kingdom, and famous for its Hindu College. **Tanjore**, on a branch of the Cauvery, a flourishing town at the head of a rich agricultural

district, was the capital of a small Marāthā kingdom. The town contains the Rājā's Palace and some large temples. **Rājāmundry** is an important town on the Godāvarī near the point where its waters divide. The East Coast Railway here crosses the river by a bridge almost two miles in length. At **Dowlaishwaram**, a little lower down, a very fine anicut crosses the river. **Ootacamund** and **Coonoor** on the Nilgiris, **Yercaud** on the Shevaroy's, and **Kodaikānal** on the Palnis, are all favourite hill stations. Ootacamund is the summer seat of the Government and has a large population.

NATIVE STATES IN MADRAS

432. **TRAVANCORE**, the principal Native State, forms the south-western extremity of India. It has an area of nearly 7,000 square miles and a population of 2½ millions. It is well watered and fertile and is noted for its pepper and cardamoms. **Trevandrum**, the capital, is towards the south. **Quilon** and **Alleppey** are sea-ports. **COCHIN** is a small State between Travancore and Malabar. The capital is **Ernākulam**, near the British town of **Cochin**. In Cochin there is a considerable colony of Jews, and in Travancore one of Syrian Christians. Both these communities are very ancient. **PUDUKKOTAI** is a small State south-west of Tanjore under the Tondiman Rājā.

MYSORE

(See Map, page 182.)

433. **MYSORE** lies west of Madras in the southern angle of the plateau of the Deccan. It has an area of 29,400 square miles, and a total population of about 5½ millions. The people are for the most part of **Dravidian** race. More than five millions are **Hindus**, over a quarter a million **Muhammadans**, and the rest **Christians**, **Animists**, or **Jains**. The principal language is **Kanarese**.

434. History. In 1759 Haider Ali a Muhammadan adventurer who had been made Commander-in-Chief of the army of the Hindu Rājā, usurped the authority and carved out for himself a dominion in the south of the Deccan much larger than the present Mysore State. In 1769 he had become powerful enough to threaten the English at Madras. In 1782, Haider died and was succeeded by his son Tipū, who was slain at the capture of Seringapatam in 1799. The English then restored the ancient Wodeyar family. In 1831, owing to the misgovernment of the Mahārājā, the British took the State into

their own hands, and it was administered by British officers till 1881 when it was once more handed over to native government. Mysore is directly under the Viceroy, who is represented by a Resident at the Court of the Mahārājā.

435. Surface and Drainage. As the Eastern and Western Ghāts converge they both become higher and open out into a broad elevated tableland which is bounded on the south and west by hills of considerable height, but has no definite mountain boundary on the east. The whole of Mysore, with the exception of a few small tracts in the north, is over 2,000 feet in height, and more than a third is over 3,000 feet. The more elevated parts of the plateau are in the east and west but a ridge of slighter elevation, narrowing towards the centre, stretches almost continuously across the State from north-east to west forming the watershed. The drainage of the north and north-west is to the Kistna, the rivers **Tunga** and **Bhadra** on the west uniting to form the **Tungabhadra**, which is joined further on by the **Hugri**. The **Pālār** and the **Southern Penner** drain a small part of the east. But the main drainage of the plateau is to the **Cauvery** which rises in the Western Ghāts and flows south-eastwards through the southern portion of the State. On its way it is joined by numerous tributaries from both sides.

436. Climate and Products. The elevation of the plateau makes Mysore much cooler than the surrounding plains. The rainfall is not heavy save along the mountains in the south and west. Elsewhere it averages from 26 to 35 inches a year. The plateau is composed almost entirely of ancient crystalline rock, and therefore the soil is generally light and sandy and in need of irrigation. The streams, however, are numerous and their water is extensively used for agricultural purposes. There are numerous canals from the tributaries of the Kistna which carry the water for many miles. Mysore has also, like Madras, a large number of tanks. **Cotton** is grown in a few of the northern districts, **rice** and **sugar-cane** in the river valleys, and **ragi** almost everywhere. There are a few **coffee** and **cinchona** plantations on the hills in the west and south-west. From the forests a certain amount of **teak** is obtained as well as **sandalwood**. The latter is a Government monopoly. At Kolār, in the east, there is a rich **gold-field** and large quantities of the metal are obtained.

437. **Communications.** The **Madras Railway** runs from Jalārpēt to Bangalore with a small branch to the Kolār gold-field. The **Southern Marāthā Railway** from Poona and Goa enters the State from the north-west and runs to Bangalore, whence another line of the same system goes northward to Dharmavaram and Guntakul. The **Mysore State Railway** unites Bangalore with the City of Mysore, and runs on to Nanjangūd. Excellent trunk roads branch out from Bangalore in all directions.

438 **Chief towns.** **Bangalore** (160,000), towards the east, is more than 3,000 feet above sea level, and enjoys a salubrious climate. It is the headquarters of the Government, and contains

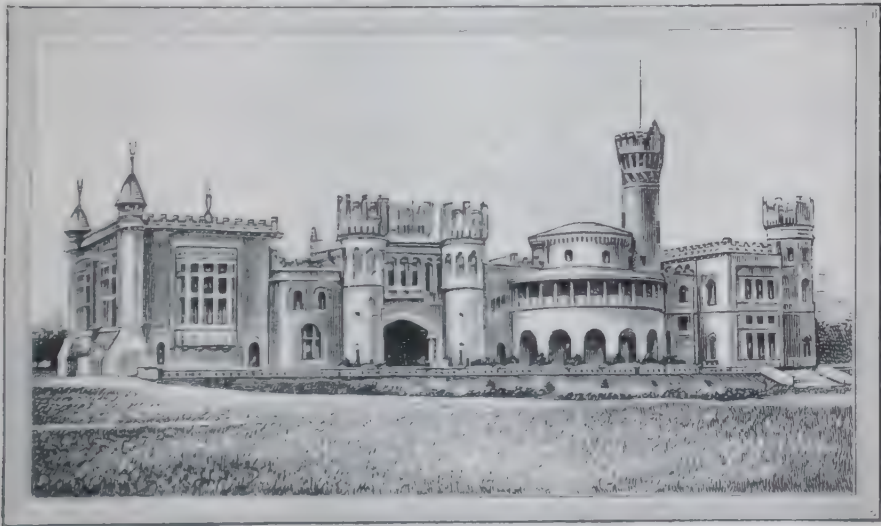


Fig. 96. The Mahārājā's Palace, Bangalore.

some fine public offices and a handsome palace. It is also a British military station and the Cantonment is British territory. To the east lies **Kolār**, the birth-place of Haider Ali, now noted for its gold. **Mysore**, in the south, is the chief residence of the Mahārājā. **Seringapatam**, northward on an island in the Cauvery, was the capital of the Haider family. Tipū was killed at the storming of Seringapatam by the British. The town is now almost deserted on account of its unhealthiness.

439. **Coorg** is a small British territory, to the south west of Mysore, with an area of 1,600 square miles and a population of 150,000. It is very mountainous. *Coffee* and *cardamoms* are the most noted products. The chief town is **Merkāra**. The Resident of Mysore is also Commissioner of Coorg.

BURMA

440. BURMA, the largest of the Provinces of the Indian Empire, lies outside of India proper. It occupies the western part of the Indo-Chinese Peninsula, taking in the whole of the coast line from the southern point of Eastern Bengal to Point Victoria on the Isthmus of Kra. On the north-west it adjoins the hilly districts of Eastern Bengal and Assam and the Native State of Manipur, and on the east it is bounded mainly by China in the north and Siam in the south. The total area of the province is 236,000 square miles, and the population is about $10\frac{1}{2}$ millions.

441. Surface. Burma consists of ranges of hills running roughly north and south and separated by long and usually narrow valleys. At the east of the high plateau of Tibet the mountain chains, which up to that point run chiefly east and west, bend round to the south in a series of almost concentric arcs, turning the Brahmaputra into the Valley of Assam. From that point they run mainly in a southerly direction. Three main chains can be traced. That nearest the river bends round a little to the west, and under various names forms the eastern frontier of India proper as far south as Chittagong. It then continues as the **Arakan Yoma** at a short distance from the coast as far south as Cape Negrais where it dips under the water to re-appear in the Andaman Isles. This range forms the western boundary of the basin of the Irrawaddy. The eastern boundary of the basin is formed by a similar range which widens out in the centre into the **Shan** and **Karenni Hills**, and then, narrowing to the south, falls to the level of the plains near the angle of the Gulf of Martaban. Between these two ranges there is a minor range of much lower elevation and broken in the centre. The northern half divides the basin of the Irrawaddy proper from that of its great tributary the Chindwin, and the southern half, called the **Pegu Yoma**, forms the western boundary of the small basin of the Sittang. The third and most easterly of the main ranges attains to greater elevations than either of the others, and runs southward for nearly twice the distance. It forms the eastern boundary of the narrow basin of the Salwin, and runs without a break to the Isthmus of Kra.

442. Coast Line. The coast of Burma contrasts strongly with that of peninsular India, being everywhere rocky, except

where the rivers have built up their deltas, and like all rocky coasts it is fringed with innumerable islands, most of which are very small. Off the Arakan coast in the north are the larger islands of **Ramri** and **Cheduba**. On the Tenasserim coast, in the south, is the **Mergui Archipelago**. Further out to sea, and stretching in a line from Cape Negrais to Sumatra, are the **Preparis**, the **Coco**, the **Andaman**, and the **Nicobar** islands, the tops of a submarine ridge enclosing a deep sea.

443. Rivers. The **Irrawaddy** is the great river of Burma. It rises in the mountains east of the bend of the Brahmaputra and flows south to the Gulf of Martaban. Being snow-fed it is always a river of great volume, and being free from rapids except in its upper course it is navigable for 800 miles from its mouth. The chief towns of Burma are upon its banks, and it forms the great highway of commerce from the interior to the coast. One of the finest fleets of river steamers in the world ply upon it, going as far north as Bhamō near the Chinese frontier. The chief tributary of the Irrawaddy is the **Chindwin** which drains the eastern slopes of the frontier hills of Eastern Bengal and Assam, and after flowing through a broad and rich valley, unites with the Irrawaddy below Mandalay. From the east the Irrawaddy receives numerous minor tributaries, the largest of which are the **Shweli** which drains the hills east of Bhamō, and the **Myit-nge** which comes down from the Shan Hills and joins the Irrawaddy near Mandalay. At its mouth the Irrawaddy forms a vast delta, and on its two chief channels stand the ports of Rangoon and Bassein. The **Salwin** is a longer river than the Irrawaddy and brings down more water, but it is hemmed in by mountains and has numerous rocky rapids, so that it is navigable only in short stretches. It rises in Tibet and flows southward to the Gulf of Martaban. The **Sittang** is a smaller river whose basin is enclosed by those of the Irrawaddy and the Salwin. It flows southward to the Gulf through a broad and level plain which forms a vast rice field. Like the Salwin the Sittang is useless for navigation, though from different causes. It is shallow in many parts, its mouth is blocked by a huge sand-bar, and it is subject to a severe tidal bore.

444. People. The people of Burma belong mainly to the **Mongolian** family. There are many allied tribes and races who are classed together as **Tibeto-Burmans**. They are not



Fig. 98. Burma in relief.

pure Mongols, like the Chinese, but in physical characteristics seem half-way between the Chinese and the Malays. In the hills there are numerous wild tribes, the chief of whom are the **Kachins** in the north, the **Shans** in the broad plateau south-east of Mandalay, and the **Karens** further south. Burma is very thinly peopled, and the demand for labour has led to the immigration of large numbers of **Chinese** and **Indians**. In some respects, especially in education, the Burmese are ahead of any of the races of India proper, but they have little enterprise or initiative. They are a very hospitable, easy and pleasure-loving people. **Buddhism** is the prevailing religion. The chief languages are **Burmese** and **Karen**, but a vast number of other **Tibeto-Burman** dialects are spoken.

445. Climate and Products. Almost the whole of Burma receives a copious rainfall, and along the coasts, and north of the Gulf of Martaban, it is very heavy. In the interior there is a drier area consisting of an oval tract running for 100 miles north and south of Mandalay, along the valleys of the Irrawaddy and Chindwin. This tract is almost surrounded by hills which shut off much of the monsoon rain, and the total fall is only about 30 inches a year. But most of the plains of Burma are hot and humid. **Rice** is the chief crop; **cotton**, **tobacco**, **pulses**, and **millets** are also grown. Far more rice is produced than the country needs, and it therefore forms the main article of export. In the forests, especially on the mountains confining the Salwīn much excellent **teak** is obtained. It is floated down the Salwīn and exported chiefly from Moulmein. **Iron ore** and **petroleum** are plentiful. **Iron** is little worked, but the production of **kerosene oil** is now sufficient to supply nearly three-fourths of the Indian demand. The chief petroleum fields are along the Irrawaddy Valley and on the Arakan coast. **Tin** is found in Tenasserim. Fine **white marble** is obtained near Mandalay, from which images are cut. There are famous **ruby** and **jade** mines in the north.

446. Communications. Railways now run from Rangoon and Bassein to Prome, 300 miles up the Irrawaddy, and round the head of the Gulf of Pegu to Moulmein. But the principal line runs northward along the rich valley of the Sittang to Mandalay, and onward at the other side of the river to Myitkyina, almost on the northern frontier. From Mandalay a branch runs through the Shan States to Kunlong Ferry on

the Salwin, and on the other side of the river a shorter branch to Monywa on the Chindwin. In all nearly 1,400 miles of railway are now open. The chief through traffic is, however, still largely by river. There are comparatively few good roads in Burma. One has been constructed from Bhamō to the Chinese Frontier and (by request of the Chinese Government) 50 miles beyond it, along which overland traffic is carried on with Yun-nan.

447. History. The dominions of the native government of Burma were originally much more extensive than the present British Province. The King was very despotic, being absolute master of the lives and property of his subjects. In 1824 the reigning monarch declared war against the British, and prepared golden chains to bind the Governor-General of India. The English troops advanced to Yandabo, within 45 miles of the capital, when the Burmese were compelled to make peace by the sacrifice of Assam, Arakan and the Tenasserim Provinces. In 1852 hostilities again broke out, and Pegu was annexed. To secure the peace of India, Theebaw, King of Upper Burma, was deposed in 1885, and the country became a Province of the Indian Empire. A Legislative Council was granted in 1897.

448. Chief Towns. RANGOON (233,000), on the eastern branch of the Irrawaddy, is the third port of the Empire. The trade of Rangoon has developed rapidly of recent years, and its exports are now considerably more than twice as large as those of Madras. The other ports are **Moulmein** near the mouth of the Salwin, the centre of the timber trade, **Bassein** on the western branch of the Irrawaddy, **Akyab** on the Arakan coast near the mouth of the Kuladan river, and **Mergui** in Tenasserim. These ports are all comparatively small and their trade is chiefly coastal. Seven-eighths of the foreign trade of Burma passes through Rangoon. **Mandalay**, the last capital of the native kingdom, is a new city on the Irrawaddy. **Amarapura** and **Ava**, former capitals, now deserted, are in the neighbourhood. **Bhamō**, in the north, is the seat of the overland trade with China. **Prome** is a flourishing trading town on the Irrawaddy connected with Rangoon by rail.

449. The **Andaman** and **Nicobar Islands**, though geographically belonging to Burma, form a separate administration under a *Chief Commissioner*. The **Andamans** consist of three large islands and nearly 200 small ones, with a total area of about 2,500 square miles. They are hilly, and have numerous excellent harbours. The rainfall is heavy and the hill sides

are covered with valuable forests. A large convict settlement is maintained on the islands. The native inhabitants are of a low Negrito race. The **Nicobars** have an area of about 630 square miles. They are similar in most respects to the Andamans, but are peopled by a **Malay** race. **Port Blair**, on South Andaman, is the seat of the government. The meteorological observations taken on the Andamans are of great importance, as they give the earliest and most reliable storm warnings. On this account Port Blair has recently been connected by wireless telegraphy with Burma.

FOREIGN POSSESSIONS IN INDIA

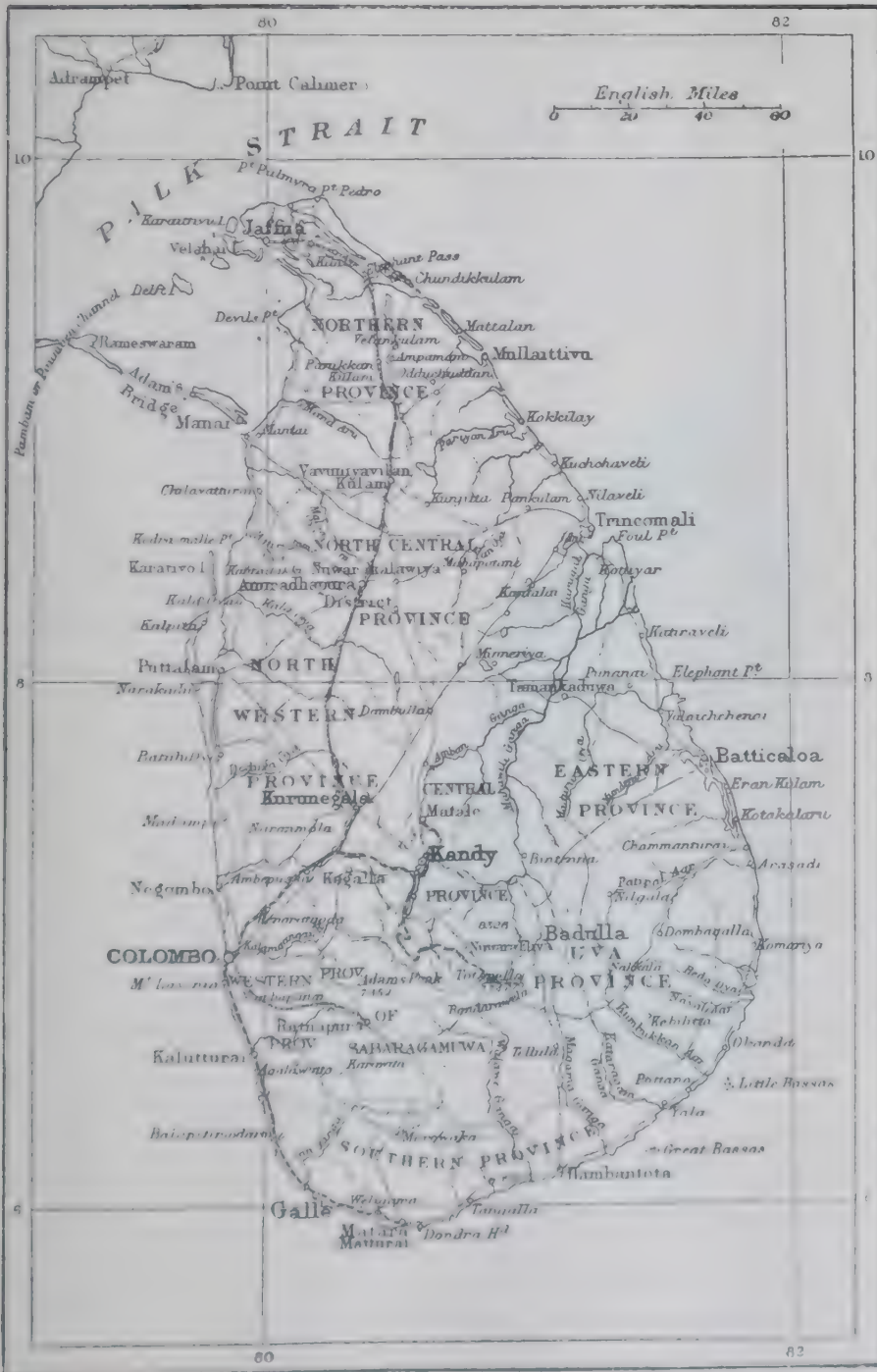
450. The **FRENCH TERRITORIES** in India are **Pondicherry** and **Karikal**, on the coast of the Carnatic ; **Mahé**, on the Malabar coast ; **Yanaon** on the Godāvari Delta, and **Chandernagore**, on the river Hooghly. They contain less than 200 square miles, and about 285,000 inhabitants. Pondicherry is the residence of the Governor. It is a small place, with but little trade.

451. The **PORTUGUESE POSSESSIONS** consist of the small district of **Goa**, **Daman** north of Bombay, and the island of **Diu** on the coast of the Kāthiāwār Peninsula. Goa was once the splendid capital of the Portuguese dominions in the east, but is now in ruins. **Panjim**, or **New Goa**, has been built nearer the sea. **Marmagoa**, the port of Goa, has the best harbour on the west coast south of Bombay. It is now served by a branch of the Southern Marāthā Railway, and its trade is growing.

CEYLON

452. **CEYLON**, the **LANKA** of the Hindus, is a large pear-shaped island in the Indian Ocean to the south-east of India. It is nearly connected with the mainland by the islands of **Manār** and **Rāmeswaram**, and a ridge of sandbanks called **Adam's Bridge**. The northern part of the channel between India and Ceylon is called **Palk Strait** ; the southern the **Gulf of Manār**. **Pāmban Passage**, between Rāmeswaram and the mainland, has been deepened, but is still navigable only by small vessels. Ceylon contains about 25,300 square miles, and has a population of over $3\frac{1}{2}$ millions.

453. **Surface**. The northern half of the island is for the most part low ; in the interior of the southern half there are elevated plateaux and lofty mountains. The tablelands vary



from 1,000 to 4,000 feet in height. **Adam's Peak**, long supposed to be the highest mountain in the island, is 7,352 feet above the sea. On its top a rude representation of a footprint has been formed of lime, which is venerated as an impression left on the rock by Buddha. **Pedrotalagala**, the highest mountain, is 8,295 feet in height.

454. Coast Line. The coast on the north and west is low and sandy: on the south-east and east it is mostly rocky,



Fig. 100. Ceylon in relief.

and in parts descends rapidly to the water and quickly sinks to great depths. The east coast has several fine natural harbours, especially **Trincomallee Bay**, which is one of the most capacious harbours in the world. It is a British naval station, but being off the main lines of the world's commerce it is of comparatively little importance. **Galle Bay**, in the south, is also a good harbour, and was much used before the artificial harbour of **Colombo**, on the west coast, was made.

455. Rivers. The **Mahawili Ganga** is the principal river. It flows from the central highlands to **Trincomallee Bay**, and is about 150

miles long, as is navigable for the greater part of its length. The other rivers are none of them over 90 miles in length. The most important are the **Kalany Ganga** and **Kalu Ganga** on the western coast, and the **Wala Ganga** in the south-east of the island.

456. Climate. Ceylon is so small that great varieties of

climate are almost impossible. On the coast all round the island it is hot, the west and south-west coasts are generally humid, while the north and east coasts are drier. No part of the island is more than 70 miles from the sea. This makes the climate free from great extremes of heat and cold. The southern half is, as a rule, much more moist than the northern half. The extreme north has a rainfall of only 50 inches a year, and in no part of the northern half does it exceed 75 inches. But in the south there is only one narrow strip along the east coast where the rainfall does not exceed 50 inches; many districts have over 100 inches, while in some it exceeds 200 inches.

457. Products. Tea, rice, coconuts, coffee, betel-nuts, cinnamon, india-rubber, and cinchona, are the principal vegetable productions. The forests yield valuable timber. Ceylon is noted for its precious stones, but plumbago is the most valuable mineral. Large quantities of salt are manufactured on the coast. Pearl oysters are fished in the Gulf of Manār. There are many tea and coffee plantations on the hills, but of late years the growth of coffee has greatly declined, cinchona and india-rubber having taken its place. The cultivation and manufacture of tea are rapidly increasing. The foreign commerce amounts to about eighteen millions sterling. The chief exports are tea, cocoa, plumbago, coconut products, cinchona, india-rubber and coffee. There are now more than 560 miles of Government railways in the island.

458. People. The population is about $3\frac{1}{2}$ millions. The Sinhalese inhabit the central and southern parts of the island; the Tamils, the north-eastern districts. Moors, or Muhammadans, are scattered throughout the island. The Veddahs are a wild tribe in the interior. Buddhism is the prevailing religion among the Sinhalese, and Hinduism among the Tamils. Christianity has made much progress.

459. Government. Ceylon is a British Colony, and is ruled by a Governor aided by an Executive Council of 5 members and a Legislative Council of 17. For many centuries the island had kings of its own. In 1518 the Portuguese obtained possession of the maritime districts, but were expelled in 1656 by the Dutch. In 1796 the English conquered the Dutch possessions, and in 1815 their authority was established over the whole island.

460. Chief towns. **COLOMBO** (158,000), the capital, situated on the west coast is a growing town and a seaport of great importance. It is the chief port of call for many lines of steamers trading between Europe and India, China, Japan, and Australia. Its harbour is commodious and is protected by a fine breakwater. Docks have recently been constructed. **Galle**, on the south coast, is the second seaport. It has a good harbour, but much of its trade has now passed to Colombo. **Batticaloa** and **Trincomallee** are ports on the east coast. **Jaffna**, in the north, is a thriving town now connected



Fig. 101. Ruins at Anuradhapura.

by rail with Colombo. **Kandy** was the last capital of the Sinhalese kings. **Nuwara Eliya**, 6,200 feet above the sea, is a sanatorium. **Anuradhapura** was the Buddhist capital of the island, and has extensive and interesting ruins.

461. THE MALDIVES, south-west of Cape Comorin, are groups of low coral islands under a petty Sultān. Coconuts, fish and cowries are the principal exports. The Sultān is tributary to the Governor of Ceylon.

INDO-CHINESE PENINSULA

462. The South-Eastern Peninsula of Asia, formerly called **Further India**, or **India beyond the Ganges** includes the countries between the Bay of Bengal and the China Sea. China forms its northern boundary. The area and the population are both uncertain, as only estimates have been made. The Peninsula is about one-third less than India in extent, but has only about one-tenth of its population. The interior consists of chains of mountains running north and south, enclosing valleys which gradually widen towards the sea, and form the beds of large rivers. These rivers are the **Irrawaddy**, **Sittang**, **Salwin**, **Menam**, and **Mekong**, or **Cambodia**.

463. **Climate and Natural Products.** The climate is generally hot and moist. The rainfall is everywhere fairly abundant, and all over the western half of the peninsula, which is well within the monsoon area, it is very heavy especially in June and July. The plains are therefore well adapted for **rice**, which is the chief grain grown, and the hills are covered with dense forests of valuable trees. The **rubber tree** abounds, but unfortunately vast numbers have been felled. **Teak** is more abundant here than in any other part of the world, and is the most valuable forest product. **Ebony**, **mahogany**, **red-wood** and other timbers are also exported. The **bamboo** is very plentiful. **Precious stones** are found in the central districts, and there are **tin** mines in the south. The animals are nearly the same as those of Eastern India with the addition of the orang-outang, a large ape.

464. **People.** The inhabitants belong to the **Mongolian** and **Malayan** races. They are robust, but for the most part of lower stature than the Hindus. Their houses are chiefly constructed of bamboos and matting, with thatched roofs, and, as the country is subject to floods, are generally built on posts about four feet from the ground. Their languages, which are very numerous, belong to the **Tibeto-Burman** family, with the single exception of **Malay** in the south.

465. The peninsula includes **Burma** in the west; **Siam** in the centre; **Tonquin**, **Annam**, and **French Cochin China** in the east; and in the south **Malaya**, including the **Federated Malay States** and the **Straits Settlements**. Burma, as a Province of the Indian Empire, has already been described.

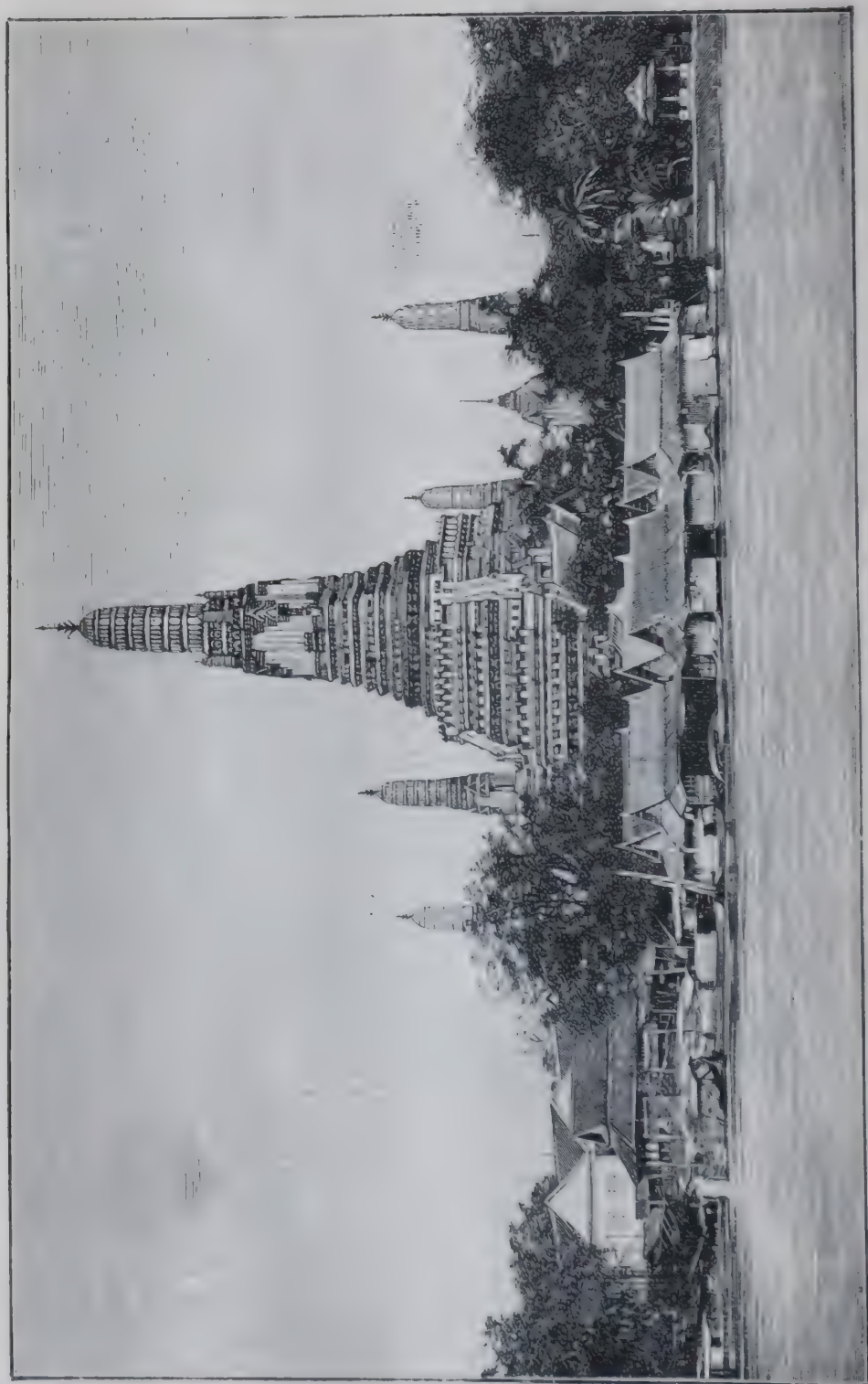


Fig. 102. View of Bangkok from the river.

SIAM

466. **SIAM** is situated to the east of the Pegu and the Tenasserim Divisions of Burma, and north of the Gulf of Siam. It also includes the northern half of the Malay Peninsula. The country consists chiefly of a large fertile valley, watered by the Menam, and enclosed by two mountain ranges. It was at one time much more extensive than it is now, France having largely encroached in the east. Its area now is about 220,000 square miles.

467. **People.** The population is estimated at nearly 7 millions. The Siamese are chiefly **Mongolian** in race and greatly resemble the Burmese. Until lately most of the people were in a state of servitude almost amounting to slavery, owing to the fact that a creditor could enslave a debtor. This has now been abolished. There are many **Chinese** settlers. **Shans** are also numerous in the north, and **Malays** in the south. The prevailing religion is Buddhism. The government is despotic, and the sovereign appoints his own successor. The brother, or son, of the sovereign is termed the second king, and has considerable influence.

468. **Communications and Commerce.** Railways belonging to the State run northwards from Bangkok along the valley of the Menam to Paknam, and eastwards to Korat. The former will soon be extended to Chieng-mai. There are also two small lines owned and worked by private companies. Altogether the lines opened are about 400 miles in length, and others are under construction. But the rivers are the chief routes of commerce, both the **Menam** and the **Mekong** being navigable. The chief **exports** are *rice, teak-wood, pepper, fish and hides*; the chief **imports** are *cotton goods, treasure, opium, and kerosene oil*. The trade is mostly with China and India.

469. **Towns.** **Bangkok** (500,000), the capital, is on the delta of the Menam about 20 miles from the mouth of the river. About a third of the population live in floating houses built on bamboo rafts, which are moored to posts fixed in the water. But the town is rapidly improving, and has now an excellent system of electric tramways. The trade is chiefly in the hands of the Chinese. **Ayuthia**, the ancient capital, is higher up the same river. **Chieng-mai** is a trading town in the north west.

FRENCH INDO-CHINA

470. The eastern coast of the Indo-Chinese Peninsula includes **Tonquin**, or **Tong-King**, in the north ; **Annam** (south country), in the middle ; and **French Cochin China** in the south. Tonquin has been seized by the French, and the King of Annam is now under French control. In 1904 about 8,000 square miles of Cambodia, in the south, was ceded to France by Siam.

471. **TONQUIN** consists of the basin of the **Songkoi** (Great River) which flows into the Gulf of Tonquin. **ANNAM**, also called Cochin China, is south of Tonquin and east of the Mekong. The Annamese are descendants of the Chinese who conquered the country. Buddhism, united with the worship of ancestors, is the prevailing religion. **Hanoi**, up the river Songkoi, is the capital of Tonquin ; **Haiphong** is the chief seaport. **Hué**, on the sea-coast, the capital of Annam, is fortified in the European style.

472. **FRENCH COCHIN CHINA** lies to the south-west of Annam and includes the delta of the Mekong. **CAMBODIA**, to the north-west of French Cochin China, is now also French territory. The two provinces have an area of about 56,000 square miles and a population of $3\frac{1}{2}$ millions. Cambodia, once a powerful kingdom, contains some magnificent ruins. It is noted for a yellow gum resin, called *Gamboge*. **Saigon**, the capital of French Cochin China, is on a branch of the Mekong. **Udong**, the former capital of Cambodia, is inland.

MALAYA

473. The greater part of the Malayan Peninsula consists of small States, the more northern of which are subject to the King of Siam while those in the south are under native rulers. **Kedah** and **Perak** in the north and **Johore** in the south are the principal States, but **Pahang** is the largest. Malaya is joined to the mainland by the narrow **Isthmus of Kra**.

474. The **FEDERATED MALAY STATES** include **Perak**, **Selangor**, **Nigri Sembilan** and **Pahang**. By a treaty with Britain they are administered by the Native Rulers under the advice of a British Resident, who is subject to the Governor of the Straits Settlements. Their area is 35,000 sq. miles, and their population about a million. They are rich in natural resources,

especially minerals. Perak and Selangor yield more than half the **tin** of the world. Pahang is rich in **gold**. There are several railways, chiefly in Perak and Selangor. The land is very fertile, and considerable quantities of **coffee** and **rubber** are exported. The **mangosteen**, one of the most delicious fruits in the world, is a native of the Malay States.



Fig. 103. A Malay Village.

475. The STRAITS SETTLEMENTS include the islands of Singapore and Penang, with Wellesley Province and Malacca in the Malayan Peninsula. The area is about 1,200 square miles, and the population about 600,000. The Straits Settlements were under the Government of India till 1867, when they were made a Crown Colony under a Governor.

476. Singapore is situated on a small island at the southern extremity of Malaya. It is one of the most important ports in Asia, as it is on the direct route between Europe and India on the west, and China and Japan on the east. It is also a

British naval station of considerable importance, and is strongly defended. Its commerce is very extensive. **Malacca** is a district in the west of Malaya, with a town of the same name. **Penang** is a small fertile island off the west coast of Malaya ceded to the English by the Rājā of Kedah. **Wellesley Province** is a district on the mainland, opposite Penang. The port of Penang shares the local trade with Singapore, but it lies somewhat off the main trade route.

CHINESE EMPIRE

477. The CHINESE EMPIRE is bounded on the north by Asiatic Russia, on the east by the Pacific, on the south by the Indo-Chinese Peninsula and India, and on the west by Russian Turkestan. It is composed of **China Proper**, and the dependencies of **Manchuria**, **Mongolia**, **Tibet**, and **Eastern Turkestan**. According to the latest Chinese estimates the area and population are as follows :—

	Square miles.	Population
CHINA	1,532,420	407,253,000
MANCHURIA	363,610	16,000,000
MONGOLIA	1,367,600	2,600,000
TIBET	463,200	6,500,000
EASTERN TURKESTAN	550,340	1,200,000
	4,277,170	433,553,000.

This estimate of the population is in all probability, however, excessive. Many competent authorities hold that the population of China Proper does not exceed 300 millions.

CHINA

478. CHINA PROPER, in the south-east, is the richest and most populous part of the Empire. The dependencies, nearly twice its size, contain less than one-twelfth of its inhabitants.

479. **Surface.** In the east vast and fertile plains, forming the lower basins of the great rivers Hoang-Ho and Yang-tse-Kiang, extend for 600 miles from north to south, and far inland.

These plains are mainly alluvial. South of the delta of the Hoang-Ho the rocky peninsula of **Shantung** stretches eastwards, dividing the Gulf of Pechili from the Yellow Sea. Towards the west and south the elevation increases, and the country is mainly composed of fertile river valleys, separated by irregular mountain-ridges. The far west, bordering on Burma, is an elevated plateau intersected by a series of mountain chains running north and south. Here the valleys along which the rivers make their way seldom fall below 5,000 feet above sea level. From the north-east of Tibet a prolongation of the great Kuen Lun range stretches eastward across China, throwing out spurs to the north and south. This range, or series of



Fig. 104. A river bed in the Loess.

ranges known by many names but together called the **Pe-ling Mountains**, separates the basin of the Hoang-Ho from that of the Yang-tse Kiang, and divides China into northern and southern parts which differ greatly in character. The north consists largely of **loess**, a soft and porous rock which has apparently been formed not by water but by wind. It is a consolidated accumulation of desert dust, and in many places is several thousands of feet in thickness. The pores in the loess are perpendicular, made probably by the stalks of deep jungle grass. The layers accordingly weather vertically, the streams often cutting deep courses with perpendicular sides.

The loess soil is very fertile. It is light, and yellow in colour, and being carried down by the Hoang-Ho (Yellow River) gives that river and the Yellow Sea their names. South of the Pelings loess is not found ; but in the west of the Yang-tse basin is a rich red earth almost equally fertile. Towards the south the Yang-tse basin is separated from that of the Canton River (or Si-Kiang) by the **Nan-ling Mountains** which run from west to east till within 200 miles of the sea, when they bend to the north-east and run parallel to the coast for 400 miles. A multitude of spurs branch out from them in all directions, enclosing valleys of great fertility.

480. Rivers. The two great rivers of China, the **Yang-tse Kiang** and the **Hoang-Ho**, both rise amid the snows of Tibet. The **Yang-tse** at first flows east, and then southwards for 500 miles. To the north-east of Burma its course is parallel with that of the Mekong, and within 50 miles of it. Then it bends sharply and follows a zig-zag course east-north-east to the China Sea. It receives innumerable tributaries, the largest of which are the **Min**, which joins it from the north about 1,500 miles from its mouth and has almost as large a volume of water as the Yang-tse itself, and the **Han** which also joins it from the north at Hankow. The Yang-tse is navigable for steamers for 1,000 miles, up to the town of Ichang. Above Ichang there are long and dangerous rapids, and then the river is again navigable for a further 800 miles. The rapids are not impassable for smaller craft, which are hauled up, and they have been several times navigated by river gunboats under steam.

481. The **Hoang-Ho** breaks through a gorge in the Kuen Lun Mountains and takes a north-easterly course, forming, in one part, the north-western boundary of China proper. South of the In-Shan mountains in Mongolia it flows eastwards for 250 miles and then, bending to the south, re-enters China. It continues its southerly course for 400 miles, till, north of the Pe-ling range, it receives its main tributary the **Wei** from the west. It then flows east and north-east to the Gulf of Pechili. At present it enters the sea north of the peninsula of Shantung, but a few years ago its course was to the south, to a point 300 miles from its present mouth.* The bed of the river has been raised by the silt which it brings down

*See Map on page 216.

till it is many feet above the plain. In spite of embankments it occasionally bursts its bounds and changes its course to the sea, causing disastrous floods over thousands of square miles, with immense loss of life and property. These disasters have given the river the name of "China's Sorrow." Like all the chief rivers of China the Hoang-Ho increases immensely in volume when the heavy summer rains begin, its level often rising more than 40 feet. Owing to the silting up of its bed the Hoang-Ho is not, except when in flood, navigable by large vessels. Native boats of 100 tons, however, can make use of its entire length.

482. The **Pei-Ho** is a much smaller river which also flows into the Gulf of Pechili. It is fed by numerous streams which drain the northern hills, and unite near Tientsin. It is navigable for 100 miles. The **Canton River**, or **Si-Kiang**, rises in the south-western highlands and flows almost due east to the sea. It is navigable for vessels of large size as far as Wu-Chow, 120 miles from its mouth. Higher up navigation is impeded by rapids up which smaller craft are hauled.

483. China has the most magnificent system of river communications in the world, and its great towns cluster along the river banks. An artificial waterway, the **Imperial Canal**, runs from Tientsin in the north to Hangchow in the south. It is over 700 miles in length and was constructed more than 1,000 years ago.

484. Climate. The whole of China except a small strip in the south lies within the North Temperate Zone. In winter the temperature decreases very rapidly to the north, while in summer the difference is comparatively trifling. In June the mean temperature south of Canton is 80°F., and north of Shantung 70°F.; in January, 60°F. and 20°F. respectively. There is thus a much greater range of temperature in the north than in the south, the summer heat and winter cold being both considerable. The Pei-Ho in the north is frozen for about three months of the year. The rainfall is plentiful except in the north-west, and, as China is within the monsoon area, the wet season is in the summer. The rains steadily increase from May to July and then diminish gradually. August and September are still fairly wet, but November and December are dry. Near the change of the monsoons the China seas are subject to very severe cyclones called **Typhoons**.

485. Natural Products. Rice and tea are the principal objects of cultivation, and are grown chiefly in the south and south-east. Sugar, cotton and indigo are also cultivated in the south, and opium on a very large scale in the south-west. Wheat, barley, maize, millets, and pulses are grown in the north. The bamboo is very plentiful, and is used for many purposes including the manufacture of Chinese paper. The tallow and camphor trees yield valuable products.

486. Fish and the **hog** are the chief animal foods. The fisheries in the rivers and lakes are exceedingly productive. Gold and silver fish came originally from China. As the country is populous and exceedingly well-cultivated there are few wild animals. Horses and cattle are not numerous. Beautiful pheasants are found in the woods. The silk-worm is widely reared and much silk is produced. The mulberry, upon which the silk-worm lives, is grown almost everywhere.

487. China is rich in minerals, but they are not as yet much worked. Copper, zinc, and quicksilver are found in the western mountains; iron is also abundant. The basins of the Hoang-Ho and Yang-tse contain some of the greatest coal beds in the world, over 70,000 square miles in extent. Kaolin, a porcelain clay of the finest quality, is also a valuable product.

488. People. The Chinese belong to the Mongolian family. They are ingenious, industrious, and thrifty; very conservative and exclusive, and much attached to ancient customs. In religion they are mostly Buddhists, but the higher classes are followers of Confucius, Confucianism being the State religion and the Emperor the sole high priest. Taoists are also numerous, and the worship of ancestors is universal. There are about 30 million Muhammadans in the Empire and 1¼ million Christians. Christianity is spreading in the more accessible parts of China with increasing rapidity, but in some of the Provinces the small Christian community has had to suffer bitter persecution.

489. The Chinese attained a considerable degree of civilization at a very early period. They were acquainted with printing, paper making, and the mariner's compass, long before these were known to Europeans. Little advancement, however, was made for many centuries owing to their veneration for antiquity and their contempt for other nations. This is now passing away. They are rapidly learning to utilize all

western inventions. The opposition of the Chinese to foreign enterprise within the Empire is due now, not to any contempt for foreigners, but to a natural desire that the resources of the country should be developed by native industry and capital alone.

490. Government. About 2,000 years ago the Chinese erected a vast wall, which still exists, 1,250 miles in length, to prevent the incursions of the Tartars; but in 1279 the country was conquered by the Mongols, and in 1644 it came under the Manchu Tartars who still occupy the throne. The form of government is autocratic. The Emperor has two advisory councils, but he is nevertheless supreme, and laws are made



Fig. 105. Wall of China.

From a photograph at Kupei K'ou, near Peking.

by *edicts*. A strong reform party is endeavouring to limit the autocratic power and a Constitution will in all probability soon be granted. The eighteen Provinces are ruled by Vice-roys who wield all power and are responsible to the Emperor. Great advance has been made in administration during the last quarter of a century, and now the various departments of government are presided over by eight Boards. In 1895, China was defeated by Japan, who took from her the island of **Formosa** and the **Pescadores**. England, Germany and France have small territories in China which they hold nominally on

lease. Until 1842 Europeans were allowed to trade only at the port of Canton. In that year four additional ports (henceforth known as "Treaty Ports") were opened, and the number has since been frequently increased till now all the important ports are open to the commerce of the world.

491. Industries and Commerce. The old and famous hand-manufactures of China were **silk**, **porcelain**, and **lacquer-ware**. **Ivory carving** was also common. These are all declining. On the other hand industries dependent on steam power have been introduced and are slowly developing. The chief of these are **spinning** and **weaving** in cotton, wool, and silk. There has also been a considerable development in **mining**, especially for **coal**, **tin**, **iron**, and **gold**. In connection with the Chinese State Railways there are now large **engineering works** at Hankow. The principal **imports** are cotton goods, opium, kerosene oil, metals, sugar, and rice; the **exports**, silk, tea, raw cotton, furs, beans, and hides. Opium is imported from India; cotton goods from England and India. The sea-borne foreign trade is chiefly with England, India, and the United States; and there is a growing overland trade with Russia. The total foreign trade of China amounts to about 80 millions sterling.

492. Communications. The waterways of China have for ages been the principal highways of commerce. There are good "fair-weather" roads in many parts, but few of them are metalled. Railways are now being opened in many directions. Some of these have been constructed by Chinese engineers and with Chinese capital, others by foreigners under agreement with the Government, who commonly retain the right to buy after a given number of years. The chief Railway is from Peking to Hankow, a distance of 750 miles. This line crosses the Hoang-Ho by a bridge two miles in length, and will soon be carried south to Canton, a further 650 miles. Altogether China has at the present time over 3,500 miles of rail; and at least 4,000 miles more are projected and surveyed.

493. Chief towns. **Peking** (Northern Court), the capital, is situated in the north-east, near the river Pei-Ho. The population is estimated at 1,600,000. Peking consists of two portions—the Chinese and Tartar cities, the latter containing the imperial palace and gardens. **Tientsin** (750,000), on the Pei-Ho, is the port of Peking. **Hankow** on the Yang-tse, at the junction of the Han River, 700 miles from the sea, is a large trading town

accessible to sea-going vessels. **Wuchang**, the capital of the province, is on the opposite bank of the Yang-tse, and **Hanyang** is on the same side of the Yang-tse as Hankow but on the other side of the Han. These three towns practically form one vast commercial city at the heart of China with over 2,000,000 inhabitants. As China develops her railway system this joint city will become increasingly important as the great commercial capital of the Empire. **Ichang**, about a thousand miles up the



Fig. 106. A Street in Canton

Yang-tse is the limit of steam navigation. **Shanghai** (650,000), is a great centre of foreign commerce, and has a large European population. **Nanking** (Southern Court), on the Yang-tse, was the ancient capital. It is noted for its cloth manufactures. **Canton** (900,000) in the south, was till 1842 the only place which foreigners were allowed to visit. It is situated near the

mouth of the Si-Kiang, and has a large tea trade. Other ports are **Amoy** and **Foochow**, opposite Formosa; and **Ningpo**, noted for its silk trade, opposite the island of Chusan.

494. **Foreign Possessions in China.** **Macao**, belonging to the Portuguese, and **Hong-Kong** to the English, are two small islands south of Canton. Macao came into the possession of the Portuguese in 1580, and Hong-Kong was acquired by the English in 1842. **Hong-Kong** is the great centre of trade between Great Britain and China, and a most important naval station. The population is about 300,000, mostly

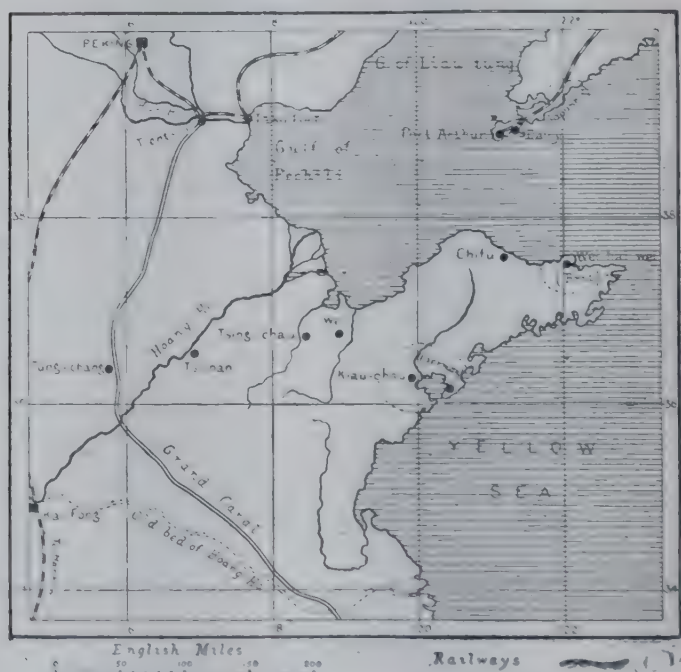


Fig. 107. The Shantung and Liautung Peninsulas, showing the position of Port Arthur, Wei-hai-wei, and Kiau-chau.

Chinese. Its chief town is **Victoria**. A small part of the mainland, called **Kowloon**, was ceded to Britain in 1861, and a further portion in 1900. On the peninsula of Shantung **Kiau-chau** has been leased to Germany, and **Wei-hai-wei** to Britain.

MANCHURIA

495. **MANCHURIA** lies north of Korea and south of the river Amur. The capital is **Kirinoula**, in the south. It is a moun-

tainous country, and the cold in winter is so severe that the **Amur** is blocked by ice for several months a year. The country contains some vast forests, and in the south is fertile. Oats are widely cultivated. The inhabitants, who are mostly Chinese, are thinly scattered. **Mukden**, in the south, was the ancient capital of the Manchus. A Chinese railway now runs round the Gulf of Pechili from Tientsin to Port Arthur and north to Mukden, from which place a line runs north to **Harbin** on the **Siberian Railway**. **Port Arthur** and **Talienwan**, in the Liautung Peninsula, were leased to Russia, and Port Arthur was strongly fortified. In 1905, after the Russo-Japanese war, the leases were transferred to Japan.

MONGOLIA

496. **MONGOLIA**, to the west of Manchuria, consists of a vast tableland separated from Manchuria by the **Khingan Mountains**. The northern parts are watered by the tributaries of the **Amur** and **Yenisei**. The centre contains the great **Desert of Gobi**, 1,500 miles in length, consisting of sandy or stony plains separated by low hills. Through the middle of the Desert runs a broad depression called by the Chinese the **Hanhai**, which at one time was an inland sea. The south of Mongolia is watered by tributaries of the **Hoang-Ho**.

497. The greater part of the Mongolian Plateau is dry and barren. The rainfall is very scanty, and the range of temperature is very great, the cold winds from Siberia making the winters exceedingly severe. There is, in consequence, very little cultivation of any kind. The country is inhabited by **Tartar** and **Kalmuck** tribes, chiefly pastoral and nomadic, who are ruled by their own Khāns, or Chiefs, nominally subject to China. The worship of the Grand Lama is the religion of the country. **Urga**, south of Lake Baikal, is the chief town and the residence of the Chinese Governor. **Maimatchin** (trade town), on the northern frontier, is the centre for the caravan trade across the desert between Siberia and China.

TIBET

498. **Tibet** extends eastwards from the Pamirs, and includes the vast plateau, the highest in the world, between the **Kuen Lun Mountains** in the north and the **Himalayas** in the south.

The plateau has numerous lakes, and contains the sources of several of the largest rivers of Asia—the Indus and Sutlej, the Ganges and Gandak, the Brahmaputra, Salwin, Mekong, Yang-tse-Kiang, and Hoang-Ho. The rainfall is nevertheless scanty and, except in parts, the country is dry and arid. The cold in winter is extreme. The people are **Mongolians**, Buddhists in religion. In all spiritual matters they are ruled by the **Grand Lama**, and the authority of China is represented by an **Amban** (or Viceroy) and several **Residents**. Little is known of Tibet, as it is still closed to Europeans. A British expedition, however, recently penetrated as far as Lhasa, and during 1907-08 Dr. Sven Hedin, a Swedish explorer, made a long and arduous tour through the country. The results of his observations are not yet known. A little grain, especially **barley**, is raised in the valleys, but the people are chiefly pastoral. **Sheep**, **goats**, and the **yak**, a kind of buffalo, are the principal domestic quadrupeds. The sheep are of the broad tailed species, and are employed as beasts of burden. The goats are covered with fine hair, which is largely exported. **Borax**, **gold**, and **salt** are the chief mineral products. The trade of Tibet is chiefly with China, but there is a small trade with India across the Himālayan passes. The capital, and residence of the Grand Lama, is **Lhasa**, situated in a broad valley watered by a tributary of the Tsanpu, or Brahmaputra.

EASTERN TURKESTAN

499. EASTERN TURKESTAN, to the north-west of Tibet, and south of the **Thian Shan Mountains**, consists of an elevated plateau surrounded on all sides, except the east, by lofty mountains, and enclosing a deep depressed area, the **Tarim Basin**, once an inland sea, in which the drainage is to lake **Lob Nor**. The surface consists chiefly of rock, or of vast sand dunes which move slowly westward before the prevailing winds. In past ages this moving sand has enveloped and buried numerous considerable cities. Here and there are grass **oases** where grain and fruit are grown and where the towns are situated. A valuable mineral product is **jade**, large quantities of which are sent to China. The chief towns are **Kashgar**, **Yarkand** and **Khotan**. Yarkand is the headquarters of the trade with India across the **Kārākorum Pass**.

EMPIRE OF JAPAN

500. The EMPIRE OF JAPAN consists of the islands of **Nippon** or **Honshiu**, **Yezo** or **Hokkaido**, **Kiushiu**, **Shikoku**, **Taiwan** or **Formosa**, and many smaller ones, including the volcanic **Kurile Islands** to the north-east and the **Luchu Islands** to the south-west. It also includes half of **Sakhalin**, and the southern portion of the **Liautung Peninsula** (including **Port Arthur**, **Talienwan**, and **Dalny**) wrested from Russia. The last is nominally held on lease from China. The total area, including Korea, is about 244 000 square miles, and the population about 60 millions. **Formosa** and small islands called the **Pescadores** (Fishermen Islands) were taken from China in 1895. Japan has been called an Asiatic Britain. It occupies a similar position in Eastern Asia to that occupied by Britain in Western Europe, and its climate is almost the same.

501. **Surface and Climate.** The large islands are traversed by lofty mountain ranges containing several active volcanoes. **Fusiyama**, or **Mount Fuji**, in Nippon, over 15,000 feet in height, is considered sacred. Earthquakes are sometimes very destructive. The valleys and plains are fertile, and the coasts are indented by numerous deep bays forming excellent natural harbours. The climate is temperate, but the north is much colder than the south. The **Kuro Sivo**, or Black Current, the northern arm of the Pacific Equatorial Current, sweeps along the east coast, and makes it warmer than the west. The rainfall is abundant all the year round.

502. **Natural Products.** Japan is rich in minerals. **Copper**, **iron** and **sulphur** abound, and **gold** and **silver** are also present, and are worked to a small extent. **Coal** is plentiful. **Petroleum** is also found, and the oil fields are being developed. **Rice** is the principal article of food: but **beans**, **wheat**, and **barley** are also extensively grown. The **tea plant** is so abundant that hedges are composed of it. **Tobacco**, **cotton** and **indigo** are widely cultivated. In **Formosa** **camphor** is a government monopoly, and is obtained in large quantities. The varnish employed in rich lacquered ware is manufactured from the resin of a Japanese tree. The process of lacquering is therefore called "Japanning."

503. People. The Japanese belong to the **Mongolian** family. They are energetic, courteous and self-reliant. They boast a very ancient history, and the present ruling dynasty has been on the throne for nearly 2,500 years. Till comparatively recently they held themselves rigidly aloof from the western world, and were exclusive and prejudiced. All that has passed away, and during the last half century they have welcomed every western influence that would enable them to increase their power and wealth. The country is now open to all, and western enterprise is welcomed and imitated. Elementary education is now compulsory, and is provided by the State. There are two Universities, and special colleges have been established for medicine, law, science, engineering, etc. **Shintoism**, which consists chiefly in hero-worship, and **Buddhism** are the prevailing religions, but there is perfect religious freedom. Christianity is spreading. By an order of Government (which had, however, no religious significance) Sunday is now observed as a day of rest.

504. Manufactures and Commerce. **Silk, cotton, porcelain, lacquered ware and paper**, are the chief manufactures. Cotton and woollen goods, sugar, metals, and kerosene oil, are the chief **imports** ; raw silk, tea, rice, coal, and lacquer-ware, are the principal **exports**. The total value of the foreign trade is about £60,000,000.

505. Government, &c. The **Mikado**, "The Venerable," was an absolute monarch until 1889, when a definite Constitution was granted. The Emperor now exercises the legislative power with the consent of the **Imperial Diet**, without which no law is valid. The Imperial Diet consists of a **House of Peers** and a **House of Representatives**. There are about 4,500 miles of railway in Japan, chiefly State Railways, and about 20,000 miles of well-made roads. There are also excellent postal, telegraph, and telephone services. The total revenue for 1905-6 was £31,000,000.

506. Towns. **Yedo**, now called **Tokio**, the capital, in the east of Nippon, has a population of $1\frac{1}{2}$ millions. **Yokohama** is the port of Tokio. **Osaka**, in the south-west of Nippon, is next in size to Tokio. **Kioto** was the former capital. **Nagasaki**, on the island of Kiushiu, was long the only port at which foreign trade was permitted. **Tamsui** in the north, and **Tai-wan-foo** in the south, are the chief ports in Formosa.

KOREA

507. KOREA is a peninsula jutting out in a southerly direction from the coast of Northern China, between the Yellow Sea and the Sea of Japan. A chain of mountains, attaining a height of nearly 9,000 feet, runs along the east of the peninsula, leaving only a narrow coastal plain. West of the hills the country is undulating and very fertile. The total area of Korea is about 90,000 square miles, and its population is estimated at 12 millions. The Koreans are **Mongols**, and use a language which appears to be equally related to Chinese and Japanese. In religion they are chiefly **Buddhists**. But they pay little attention to religion, and until recently priests and temples were prohibited in the capital.

508. Government. Up to 1894 Korea was an absolute monarchy, owning the suzerainty of China. This suzerainty Japan disputed, and it became one of the chief causes of the war between the two nations in 1895. Subsequently Russian influence became paramount at Seoul and was a serious menace to Japanese interests. The victory of Japan, first over China and then over Russia, freed Korea from all danger from these powers only to make her more completely subject to Japan. While remaining nominally independent, she fell under the domination of the Island Power. In 1907, Korea appealed to the Peace Congress at the Hague, and Japan retaliated by deposing the Korean monarch and formally annexing the country.

509. Productions and Commerce. Korea is chiefly an agricultural country, but has considerable mineral wealth. **Rice, wheat, barley, beans, and tobacco** have long been grown, and the Japanese have begun the cultivation of **cotton** on a large scale. **Ginseng**, a root which yields an intoxicating drug valued in China, is also cultivated. **Gold and copper** are found, and mining operations are increasing. Since 1895 the foreign trade has risen from 1½ to 3¼ millions sterling a year. It is chiefly with Japan.

510. Chief towns Seoul, the capital, on the west coast has a population of about 200,000. Three sea-ports are open to foreign trade. **Chemulpo**, on the Han river, **Fusan** on the south coast, and **Yuen-san** on the east coast, all of which are now connected with Seoul by rail.

ASIATIC RUSSIA

511. ASIATIC RUSSIA includes all the north of Asia. In the west it adjoins European Russia, and in the south Persia, Afghānistān and the Chinese Empire. On the north it is bounded by the Arctic Ocean, and on the east by the Behring Sea, the Sea of Okhotsk and the Sea of Japan. The principal political divisions are **Siberia** in the north ; the **Trans-Caucasian Provinces** in the south-west ; and **Russian Turkestan** in Central Asia. The total area exceeds $6\frac{1}{2}$ million square miles, or more than $1\frac{1}{2}$ times that of Europe ; but the population is only about 22 millions.

SIBERIA

512. SIBERIA consists of a vast and almost unbroken plain, stretching across the north of Asia from east to west and rising very gradually from the Arctic Ocean to the Altai Mountains. It is traversed by the **Obi**, **Yenisei**, and **Lena**. The **Amur**, flowing eastward, forms part of the boundary between Siberia and Manchuria. The **Ili**, in the west, flows into Lake Balkash. In the south-west there are sandy plains forming a broad area of **Steppe** stretching west of the Altai mountains to the north of the Caspian. From the east of Lake Baikal a long belt of highlands, here and there broadening out into plateaux, run in a north-easterly direction for over 2,400 miles to East Cape on the Behring Straits, and are known as the **Yablonoi** and **Stanovoi Ranges**.

513. Rivers. The whole of the drainage of this vast region is to the Arctic Ocean. The rivers are among the largest and slowest in the world. They are frozen for half their length during the winter, and, as their upper waters thaw many weeks before the lower, and the accumulated ice near their mouths impedes the flow, great floods are the result. In the summer months the rivers are the great north-and-south highways, and owing to the gentle slope of the land they are free from rapids and navigable for fairly large vessels throughout almost their whole course. The **Obi**, with its tributaries, of which the **Irtish** is larger than the Obi itself, drains a vast basin of $1\frac{1}{4}$ million square miles, and provides over 9,000 miles of navigable waterways. It flows into the Kara Sea, and near its mouth it is five miles wide. The **Yenisei**, with its main tributary the

Angara, which drains **Lake Baikal**, also discharges into the Kara Sea. The **Yenisei**, **Irtish**, and **Obi**, all rise in the Altai mountains. The **Lena** and its tributaries drain the eastern highlands and the mountains east and west of Lake Baikal, and flows into the Arctic Ocean. Unlike the **Obi** and the **Yenisei** it forms a great delta, and reaches the sea through many channels. The **Amur** flows eastwards into the Sea of Okhotsk, and for a considerable part of its course forms the boundary line between Siberia and Manchuria. **Lake Baikal** is the largest fresh water lake in Asia. It is formed by a great rift in the crystalline mountains, and is over 4,000 feet in depth.

514. Climate. In the north the winter cold is intense, and rapidly increases to the east. Eastward along the Arctic circle in mid-winter we find the mean temperature steadily falling from 10°F. on the White Sea to -20°F. at the mouth of the **Obi**, -25°F. at the **Yenisei**, -50°F. near the **Lena**, and at Verkhoyansk a little further east to -60°F. This is a severer cold than has yet been found in the Arctic regions. Bodo, in Norway, which is slightly further north, but is protected from the cold Polar winds, and enjoys the moderating proximity of the sea and the genial warmth of the Gulf Stream Drift, has a mean winter temperature of 26°F. Between these two places in practically the same latitude there is thus the enormous difference of 86°F. Keen northern winds prevail over the greater part of Siberia. These bring but little moisture from the sea, and, since they grow warmer as they travel south, what little they do bring is not deposited. A long and fairly broad strip bordering on the ocean has therefore a very scanty rainfall. This is the **tundra** region, where the soil is always frozen excepting in summer, when it thaws on the surface only, and where, consequently, the only vegetation is dwarfed shrubs and mosses. Southward from this region the rainfall slowly increases, and a **broad forest belt** runs across the country from east to west. The northern part of this forest is near the Arctic circle and consists chiefly of low and stunted trees, *birch*, *larch*, and *silver firs*. But in the south, where both warmth and water are more abundant, the trees grow to a great height, and the forests are dense and rich. Much of the soil of this part of Siberia is excellent, and well adapted both for pasturage and cereals.

515. Products. **Wheat** is grown in the south, and **barley** and **rye** further north. Large herds of **cattle** are also kept in the west, and **butter** and **cheese** are staple products. Siberia has tens of thousands of square miles of excellent farming land, but the population is as yet sparse and the clearings comparatively few. The forests abound with wild animals which are hunted for their beautiful **furs**. **Bears** and **wolves** are the principal beasts of prey. The rivers are full of fish and the **fisheries** are productive. **Fossil ivory**, the bones of the Mammoth, a kind of elephant which in by-gone ages was common in Siberia, is dug up in the tundras. At present, the chief wealth of the country is its minerals, in which it is peculiarly rich. **Gold, silver, platinum, iron, lead, copper,** and **coal** are all found, and the first three are extensively mined.

516. People. The population is about 6 millions. Nearly one-half are Europeans, many of them convicts, sentenced to work in the mines. The native inhabitants are chiefly wandering tribes. The **Samoiedes**, the Esquimaux of Asia, live by hunting and fishing on the shores of the Arctic Ocean. The **Kirghiz** and **Ostiaks** in the south-west, the **Tunguses** in the south-east, and the **Buriats** near Lake Baikal, are pastoral tribes. *Shamanism*, or demon worship, prevails among the ruder native tribes; the others are *Muhammadans*.

517. Communications and Commerce. The rivers, on which a large number of steamers ply, are more important highways of trade than the roads, but a great trunk road runs right through the country from east to west. The rivers—broad, deep, and slow—would be of immensely greater value were it not that the northern seas into which they flow are closed by ice almost all the year. There is no shipping at all on the Lena, and very little on the Obi or Yenisei. The Amur, on the east, is open for six months of the year. A great railway runs from east to west, uniting Vladivostock with Moscow, a distance of over 5,000 miles, and thus providing a cheap and easy outlet for the produce of such parts of the country as are within its reach. It has led to a great commercial development. *Metals, furs and agricultural produce* are the chief exports. *Tea and silk* are imported from China, *machinery* and manufactured articles of all kinds chiefly from Germany and America. Omsk now exports by water great quantities of the finest butter in the world.

518. Towns. **Irkutsk**, on the Angara near Lake Baikal, is a handsome town with broad streets. It was founded about 250 years ago. Although it is the capital, the population is only 51,000. **Tomsk**, on the Tom a tributary of the Obi, is the seat of a University, and **Omsk**, on the Om a tributary of the Irtysh, is the chief trade centre of Western Siberia. **Kaikhta**, south of Lake Baikal, is the place at which the trade with China is chiefly transacted. **Yakutsk**, on the Lena, has considerable traffic in furs and fossil ivory. **Okhotsk**, on the shore of the sea of the same name, is the centre of the fur trade with Kamchatka



M. Moscow.

St. P. St. Petersburg.

S. Saratov.

H. Harbin.

VL. Vladivostock.

P.A. Port Arthur.

Fig. 108. The Great Siberian Railway.

and North West America. **Vladivostock** (*Ruler of the East*) is a naval station in the south of the Amur territory. Vladivostock is now the only port that Russia possesses on the Pacific. Though it is in about the same latitude as Marseilles it is closed by ice for some weeks every year.

519. Kamchatka, or Kamtschatka, is a large peninsula to the east of Siberia. It is traversed by a range of lofty volcanic mountains many of which are still active. The inhabitants, who are short in stature, live during the cold weather in underground huts. The chief town is **Petropaulovski**, on the south-east coast.

520. The Aleutian Islands a series of volcanic peaks extend between Kamchatka and America. The large cold foggy island of **Sakhalin** lies east of the Gulf of Tartary, and is valuable chiefly for its seal fisheries. The southern half of the island has been ceded to Japan.

THE TRANS-CAUCASIAN PROVINCES

521. The TRANS-CAUCASIAN PROVINCES lie south of the Caucasus, between the Caspian and the Black Seas, and are bounded on the south by Asiatic Turkey and Persia. The country is mountainous, well-watered, and fertile. It includes the north-eastern portion of the **Armenian Plateau**. The climate is hot in summer, but very cold in winter. *Fruits* are grown in great abundance, and, in some districts, *millets*. The chief wealth of the country is mineral. **Petroleum, manganese, and copper** are found, and vast quantities of **kerosene** are produced.

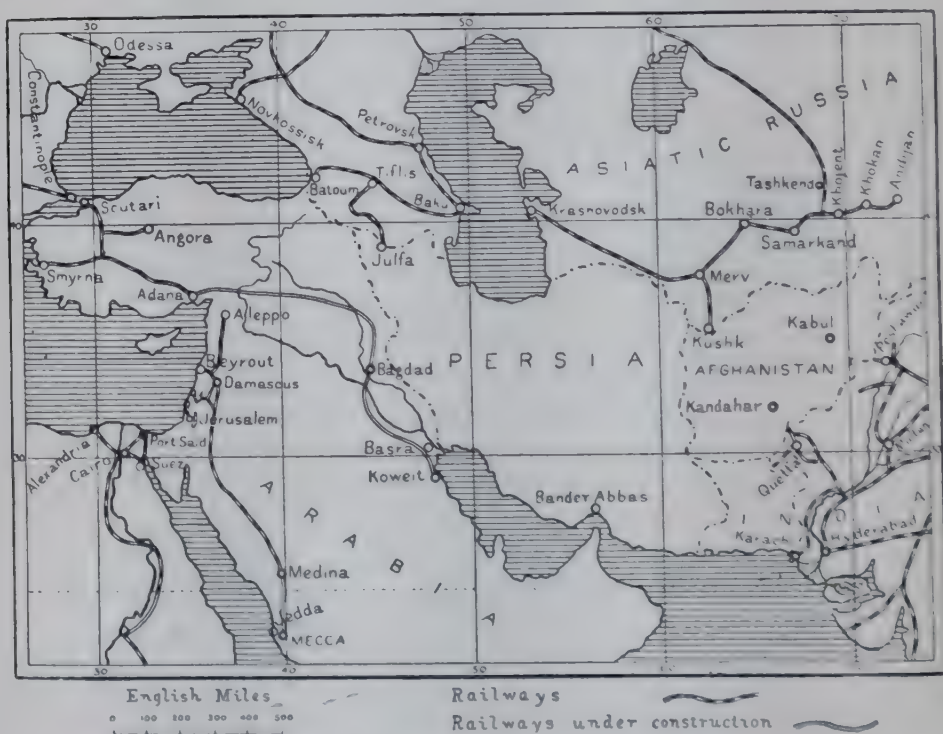


Fig. 109. Showing the Railways in Central and Western Asia.

522. Towns. Tiflis, the capital, is situated on the river Kur. It is connected by rail with the Caspian and Black Seas, as well as with Julfa on the northern frontier of Persia. It is proposed to extend the last of these lines to Teheran. Erivan is the chief town in Russian Armenia. **Baku**, on the Caspian, is the centre of the oil-producing trade. **Batoum** is a seaport on the Black Sea connected by rail with Baku.

RUSSIAN TURKESTAN

523. **RUSSIAN CENTRAL ASIA** includes the country between the Caspian and Eastern Turkestan, stretching northward to the basin of the Ob-Irtish and including the greater part of the **Steppe** between the Altai mountains and the Ural. The south and east are mountainous, but in general the surface is low, with vast wastes of sand sloping gradually toward the north. The **Syr Daria**, or **Jaxartes**, and the **Amu Daria**, or **Oxus**, both fall into the **Sea of Aral**. The Amu Daria separates the eastern part of the province from Afghānistān; and near the Caspian the **Atrek** separates it from Persia. The **Zarafshān** and **Murghab** were once tributaries of the Amu Daria but now their waters are lost in the sands, the first forming the oases in which the towns of Samarkand and Bokhara are situated, and the Murghab the oasis of Merv. The **Ili** flows into Lake Balkash. Both the **Aral** and the **Balkash** lakes are shallow and very salt. Over the whole of their basins the rainfall is less than the evaporation, and both lakes are therefore slowly drying up. The heat in summer and the cold in winter are extreme. The greater part of the country is arid and barren, being destitute even of wells; but there are fertile tracts along the banks of the rivers, yielding **grain** and fine **fruits**, and round Khiva, south of the Aral, a good deal of **cotton** is grown.

524. The chief inhabitants belong to the **Turki** race, hence the name of **Turkestan**. They are Muhammadans of the Sunni sect. The northern parts are peopled by wandering Tartar tribes, the **Kirghiz** and **Uzbeks**, who subsist on their flocks and herds. The country is noted for its horses. The national beverage of the inhabitants is mare's milk, fermented into an intoxicating drink called *koumiss*. Commerce is carried on largely by caravans.

525. **Towns.** **Tashkend** is the largest city in Russian Central Asia, and the seat of government. **Samarkand**, in the valley of the Zarafshān, was once one of the greatest cities of Asia and was the capital of the Tartar conqueror Timur, or Tamerlane (1370-1405). **Merv**, on the Murghab, was formerly a splendid city and claims to be "the mother-city of Asia." **Bokhara** was once a great centre of arts and learning. It is still noted for its numerous Muhammadan schools, and has

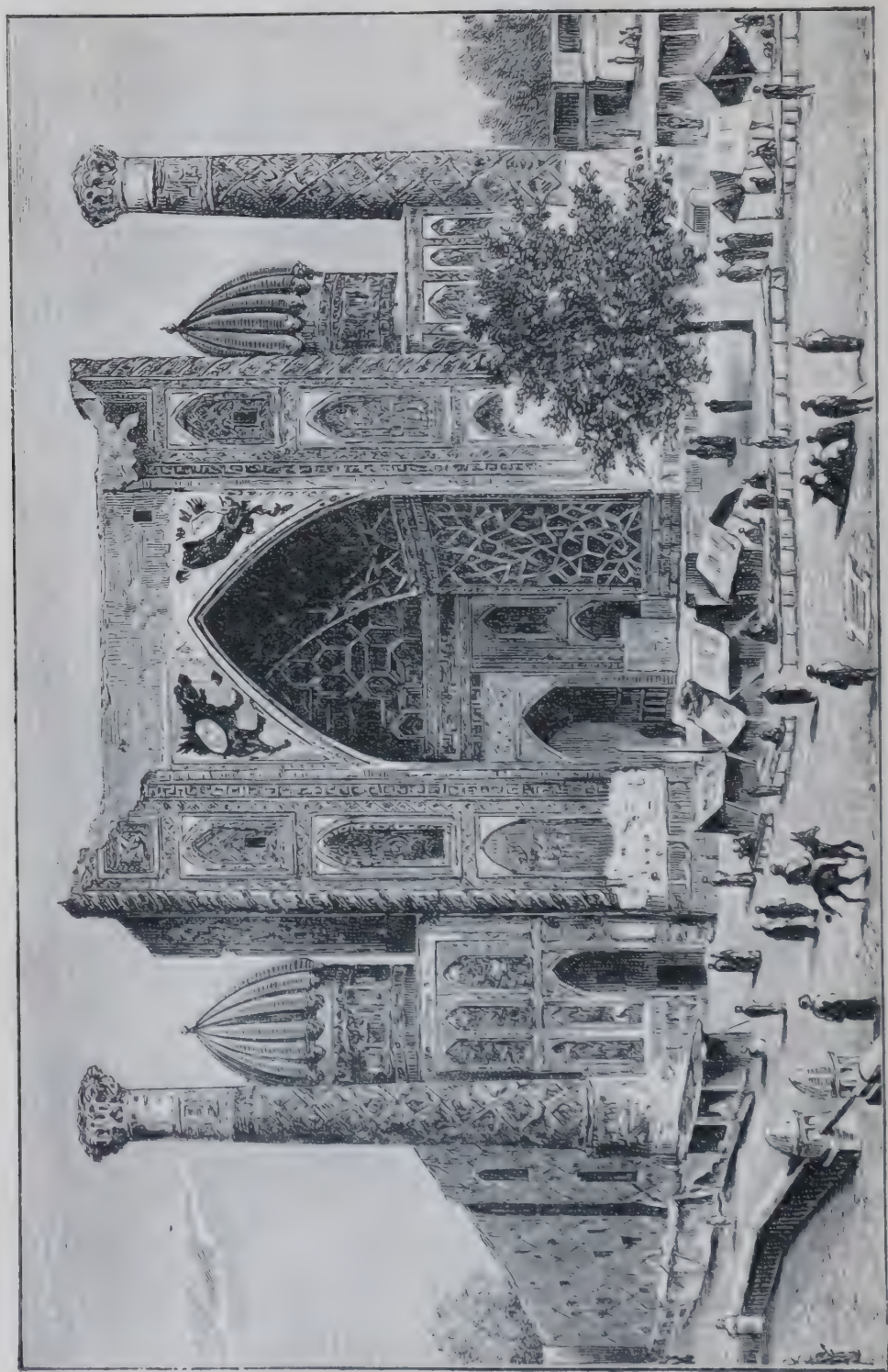


Fig. 110. The SHIR DAR, SAMARKAND, dating from the Age Tinnur. Now used as a College.

considerable trade. **Khiva**, south of the sea of Aral, once had a large slave market.

526. The **Transcaspian Railway** commences at Krasnovodsk on the Caspian, and passes through Merv, Bokhara, and Samarkand to Khokan, north of the Pamir Plateau. A branch runs north past Tashkend, the capital, and another strikes southwards from Merv and runs to Kūshk, within a hundred miles of Herāt. (See Fig. 109.)

AFGHANISTAN

527. **AFGHĀNISTĀN** is bounded on the north by Russian Turkeṣtān; on the east by the North-Western Frontier Province of India; on the south by Balūchistān; and on the west by Persia. The area is about 215,000 square miles. The country is inhabited by warlike tribes, of which the Ghilzāis and Hazāras are the chief. The language is Pushtū. Muhammadanism is the national religion. The Government is in the hands of Khāns, subject to the Amīr who resides at Kābul. By a recent agreement between Russia and England, Afghānistān is recognised as being solely within the British sphere of influence. Under Mahmūd of Ghaznī, Afghānistān was the seat of a powerful empire.

528. Surface. Afghānistān consists chiefly of a barren and rocky plateau. The **Hindu Kush** Range traverses the north-east. The **Koh-i-Bāba**, **Siāh-Koh**, and **Safed Koh** are western continuations of the Hindu Kush. The **Sulaimān Mountains** run along the eastern frontier. Seistān is a large sandy desert in the south-west, including the great inland basin of the Helmand. The principal river is the **Kābul**, a tributary of the Indus. The **Helmand** has a south-westerly course into the swampy lake Hāmūn, in Seistān. The **Hari Rūd** flows westward, past Herāt, and is lost in the sands.

529. Climate and Productions. The heat is very great in summer and the cold severe in winter. Though much of the surface consists of arid deserts and rocky mountains there are some tracts of great fertility, yielding grain, cotton, and fine fruits. Horses, cattle, and sheep are reared.

530. Towns. **Kābul**, the capital, is situated on the Kābul River in the north-east, and has considerable trade. Kābul

is 6,400 feet above the sea. It was the favourite residence of the Emperor Bābar. *Horses, wool, grapes, dried fruits, and asafoetida* are exported to India. At the entrance to the Khaibar Pass is **Jalālābād**, noted for its defence by Sir Robert Sale during the Afghān War; south of Kābul is **Ghazni**, the capital of Mahmūd, the invader of Hindustān; and further to the south-west, **Kandahār**, on a tributary of the Helmand. Near the north-western frontier is the city of **Herāt**, which has been repeatedly attacked by the Persians. **Balkh**, in the north, now in ruins, was once a splendid city, and is the reputed birth-place of Zoroaster, the founder of the Pārsi religion.

PERSIA

531. PERSIA is bounded on the north by Asiatic Russia and the Caspian Sea; on the east by Afghānistān and Balūchistān; on the south by the Persian Gulf; and on the west by Asiatic Turkey. The area is 628,000 square miles.

532. Surface. The interior consists of a high tableland, from 2,000 to 4,000 feet in height, surrounded by mountains. The **Elburz Range** forms its northern boundary. **Demavend**, the highest peak, about 18,000 feet in height, lies south of the Caspian. The central and eastern parts are composed chiefly of salt and sandy deserts. Towards the north and west there are tracts of great fertility. The rivers are few and small, and as the drainage is chiefly inland salt lakes are numerous.

533. Climate and Products. During summer the heat is excessive, especially on the low plains; on the tableland the winters are very cold. Persia includes part of the rainless zone stretching across Asia. Camels are therefore the principal beasts of burden, but Persian horses are strong and swift. *Wheat, rice, cotton, tobacco, the poppy, and asafoetida* are cultivated. The fruits of Persia are excellent, and the wine of Shirāz is considered the best in Asia. The mulberry abounds in the north, and roses are also plentiful. The Persians excel in the manufacture of carpets, shawls, and sword-blades. Silks, opium, cotton, and dried fruits are the principal articles of **export**; cotton goods are the chief **import**. Merchandise is transported by camels and asses, as there are no roads.

534 People and Government. The population is about 9½ millions. The Persians are an **Aryan** race, and are **Muhammadans** of the Shiah Sect. They are lively and polite, and have been called the "French of the East." Their language is famed for its melody. The country likewise contains a large number of rude, wandering tribes who are **Sunnī Muhammadans**. The Shah is an absolute monarch. There has recently been a double movement, a reform and a re-action. The reform party coerced the Shah into granting a Constitution which he seized the first opportunity to annul. Great Britain and Russia have recently entered into an agreement whereby the greater part of Persia is recognised as being within the Russian sphere of influence. A Russian railway now touches the northern frontier of Persia, and a railway tunnel is being bored under the Caucasus by which the Persian frontier will be brought within two days' journey of Moscow. When completed this tunnel will be the longest in the world.

535. Chief towns. **Teherān** (250,000) the capital, rather larger than Delhi, is situated in the north. During the hot season it is very unhealthy. **Tabriz** (180,000) in the north-west, is the chief commercial city. **Ispahān**, south of Teherān, was the capital under the Caliphs, and still has considerable trade. **Yezd** towards the centre, and **Meshed** in the north-east, are two chief seats of the caravan trade. **Shirāz**, east of the Persian Gulf, contains the tombs of Hāfiz and Sādi, two famous Persian poets, and is noted for its wine and roses. **Bushire**, on the Persian Gulf, is an important seaport. **Bundar Abbas**, and **Lingah** are also seaports in the Persian Gulf.

ARABIA

536. **ARABIA**, forming the south-western corner of Asia is the largest peninsula in the world. The area is estimated at 1,200,000 square miles—only one-fifth less than India. It consists of a vast plateau sloping northwards, with a hilly region in the centre, and surrounded by a narrow belt of sandy lowland. Most of the plateau consists of rocky or sandy deserts with a few fertile oases. There is no lake or navigable river in the whole country. **Mount Sinai** is a celebrated peak between the Gulfs of Suez and Akaba at the head of the Red

Sea. A chain of mountains extends along the western and southern coasts.

537. Climate and Products. Arabia is one of the hottest and driest countries in the world. It is subject to a scorching wind, called the **Simoom** which, besides raising clouds of sand,



Fig. 111. A Bedouin.

is pestilential. To avoid its deadly effect, men throw themselves flat on the ground, and beasts thrust their noses into the sand till it has passed over. At night, during the cold season, the winds are sometimes chilly and piercing. Though Arabia forms part of the rainless zone of Asia, the *centre* of the plateau has slight rains during winter. The mountain torrents are quickly swallowed up by the thirsty ground. The desert is furrowed by *wadis*, or the dry beds of water courses. *Joar*, a kind of millet, and *dates*, form the principal articles of food. *Coffee* of the finest quality is grown in the south-west. Arabia is famous for its noble breed

of *horses*; but the most useful animal is the *camel*. The *wild ass*, various kinds of *antelopes*, the *panther*, and the *ostrich*, are also natives of the peninsula. There are pearl fisheries in the Persian Gulf.

538. People. The population is estimated at 6 millions. The Arabs belong to the Semitic branch of the great **Caucasian** family, and speak a **Semitic** language. Some have fixed abodes and are fairly civilized; others, the **Bedouins**, "dwellers in the desert," are wild and fierce, living by their flocks and plunder. They are all **Muhammadans**.

539. Towns. Mecca, the birth-place of Muhammad, is about 40 miles inland from the Red Sea. It is much visited by

pilgrims. A railway is under construction from Damascus to Mecca, and is now (December, 1908), open as far as Medina. (See map on p. 226.) The *Kaaba*, in the centre of the temple of Mecca, contains a black stone, which has been considered sacred by the Arabs from an early period. All Muhammadans are commanded to visit Mecca once in their lives. **Jeddah** is the port of Mecca. **Medina**, north of Mecca, contains the tomb of Muhammad. In 622 A.D. Muhammad fled from Mecca to Medina to escape his enemies. Muhammadans reckon from this era, called the *Hejira*, or Flight. Muhammad died at Medina, 635 A.D. **Mocha**, near the Strait of Bab-el-Mandeb, was the port from which coffee was shipped. It is now deserted. **Muscat**, on the east coast, is a place of considerable trade and the capital of the Sultān of Oman, the principal chief of Arabia. **Aden**, near the entrance of the Red Sea, belongs to the English. The island of **Perim** at the mouth of the Red Sea, and **Bahrein** an island in the Persian Gulf famous for its pearl fisheries, also belong to Britain.

ASIATIC TURKEY

540. ASIATIC TURKEY includes **Asia Minor**, **Syria**, part of **Armenia**, **Kurdistan** or **Assyria**, **Al-Jezirah** or **Mesopotamia**, **Irak Arabi** or **Chaldea**, and **Arabistan** or **Turkish Arabia**. The area is about 700,000 square miles. The population, estimated at 22 millions, includes Turks, Arabs, Armenians, Turkomāns, Kurds, Syrians, Jews, etc. The country is subject to the Sultān at Constantinople. It is divided into provinces, called *Vilayets*, each under a *Vali*, a pasha of the highest rank. Historically Asiatic Turkey is the most interesting country in the world. In the valleys of the Tigris and Euphrates were the ancient monarchies of Assyria and Babylon; and in Palestine most of the events related in Scripture occurred. It was the earliest seat of Greek civilization. Homer and some of the greatest of the Greeks were born in Asia Minor.

ASIA MINOR, OR ANATOLIA

541. ASIA MINOR (Lesser Asia) is a large peninsula lying between the Black Sea and the Mediterranean. The interior

consists of an elevated tableland forming the western extension of the Iranian and Armenian plateaux. It is bounded on the north by ranges of hills extending along the coast of the Black Sea, and on the south by the Taurus Mountains, a part of the long chain of fold-mountains that includes the Atlas Mountains in North Africa and can be traced eastwards as far as the Indo-Chinese Peninsula.

Rivers. The longest river is the **Kizil Irmak** (Red River), the ancient Halys, and the next longest the **Sakaria**, both of which flow into the Black Sea. The **Meander**, **Hermus** and **Sarabat** flow westward into the Mediterranean.

542. Climate and Productions. The climate is temperate and pleasant. *Wheat, rice, maize, sugar, raisins, figs, olives, and cotton*, are the principal vegetable productions; but agriculture is much neglected. The central tablelands are nearly destitute of trees. They abound, however, with pasturage affording a plentiful subsistence to the flocks and herds of the wandering Turkomāns. The northern slope towards the Black Sea is so covered with forests, that it has received the name of the "Sea of Trees." Dried fruits, silk, goats' hair, and drugs, are the principal **exports**. There are railways from Scutari and Smyrna to the interior.

543. Towns. **Smyrna**, in the west, is the largest city and a place of great trade. **Scutari**, on the Bosphorus, is the eastern suburb of Constantinople. **Angora**, towards the centre, is noted for its goats, from the fine silky hair of which shawls are made. **Sinope** and **Trebizond** are ports on the Black Sea. **Konie**, the ancient Iconium, lies south from Angora, and is a great centre for caravan traffic across the plateau. **Tarsus**, on the Cydnus, is situated in the south-east, and is memorable as the birth-place of the Apostle Paul. To the north-east of Tarsus there is a famous pass in the Taurus range, called the Cilician Gates. This is the chief caravan route from the Anatolian Plateau to Palestine.

544. **CYPRUS** is a large and fertile island in the Mediterranean, belonging to Great Britain. It has a population of about 240,000, and is governed by a High Commissioner. Cyprus gave its name to copper, for which it was anciently noted. **Nikosia** is the capital, **Larnaca** the chief sea-port. *Wheat, barley, olives, and cotton* are grown and exported. *Sponge fisheries* are also very productive.

SYRIA

545. SYRIA lies between the Euphrates and the Mediterranean. The eastern parts are level. The double chain of the **Mountains of Lebanon** (Lebanon and Anti-Lebanon) run from north to south enclosing the fertile valley of **Cœle-Syria**. This valley is the northern portion of the great **Dead Sea Rift**, which extends through the Red Sea and Africa to 15° south of the equator (see § 749). The Dead Sea, in the south of Palestine, is 1,500 feet below the level of the Mediterranean. The **Orontes** flows northward east of Lebanon; the **Leontes** drains the southern slopes of Lebanon; and the **Jordan** flows southward in the rift valley to the Dead Sea.

546. **Productions.** The eastern and southern parts of Syria are sandy deserts; the coast and Cœle-Syria are in general very fertile. The rainfall is very scanty in the south, but fairly abundant on the northern mountains. The climate is dry and hot in summer. *Grains, fruits, tobacco, and cotton* are the principal vegetable productions. Lebanon was once famed for its *cedars*, but they are now few in number. The *vine* still grows luxuriantly, and *silk* is produced in considerable quantities.

547. **Towns.** **Aleppo**, nearly midway between the Euphrates and the Mediterranean, is the chief city in northern Syria. **Antioch**, now **Antakia**, on the Orontes, was a celebrated city in ancient times. **Damascus** is one of the oldest cities in the world, and is noted for its roses, the manufacture of sword-blades, and cloth called damask. **Beyrout**, the port of Damascus, is the largest town on the coast of Syria. **Jerusalem**, a few miles to the west of the northern extremity of the Dead Sea, is a celebrated city, the centre of Hebrew history. Here Jesus Christ was put to death, 33 A.D. **Bethlehem** is a small town about 6 miles south of Jerusalem, where Jesus Christ was born. **Jaffa**, the ancient Joppa, is the port of Jerusalem, with which it is now connected by rail; south-westward is **Gaza**, a trading town on the route to Egypt.

548. ARMENIA is an elevated plateau south-east of the Black Sea. The eastern part belongs to Russia; the south-east to Persia; the west to Turkey. The three empires meet

at **Mount Ararat**, whose summit, 17,000 feet high, is covered with perpetual snow. The **Euphrates** and **Tigris** both rise on the plateau and flow to the south-east. The **Kur**, with its tributary the **Aras**, runs eastward into the Caspian Sea. **Lake Van** is a large salt lake, 5,500 feet above the sea. The climate is hot in summer, but snow lies long on the ground during the winter. The Armenians are Christians, and are found scattered, like the Jews, over many parts of the east. **Erzeroum**, the chief town, is an ancient city, with considerable trade. It is situated on an important trade route between Persia and the Black Sea.

549. **KURDISTÂN**, the ancient **ASSYRIA**, is situated to the south of Armenia. The north-eastern parts are mountainous; the south-western are level, and watered by the **Tigris**. The Kurds who inhabit the country are a pastoral race, but independent and warlike. Their religion is **Muhammadianism**, mixed with **Pärsiism** and devil-worship. The ruins of **Nineveh**, on the banks of the Tigris, extend for about 30 miles. Excavations on the site of the ancient city have brought to light the remains of palaces and temples in which many inscriptions in "arrow-headed" characters have been found. Many of these have been deciphered and have greatly increased our knowledge of ancient history.

550. **AL-JEZIRAH**, the ancient **MESOPOTAMIA**, lies between the Euphrates and Tigris, to the south of **Kurdistân**. The surface is level. In ancient times the country was noted for its fertility; but the neglect of irrigation, and the scorching winds to which it is subject during the hot season, have converted it into a desert. The chief town, **Mosul** on the Tigris, was once noted for its fine cloths, called muslins. The ruins of **Nineveh** are opposite **Mosul**.

551. **IRAK-ARABI** (Irak of the Arabs), the ancient **BABYLONIA**, lies along the lower courses of the Tigris and Euphrates, which unite before entering the Persian Gulf. It was once very fertile, but much of it is now desert. **Baghdad**, on the Tigris, once the splendid capital of the Caliphs, has still a large caravan trade. **Hilleh**, on the Euphrates, south of **Baghdad**, is situated amid the ruins of ancient Babylon. **Bassora**, or **Basra**, on the united stream of the Euphrates and Tigris, has extensive commerce.

•

EUROPE

GENERAL VIEW

552. EUROPE is the western portion of the great old-world land-mass of Eurasia. Its greatest length from east to west is about 3,400 miles, and its greatest breadth from north to south 2,400 miles. Its peninsulas take up half of its total area, and its islands over a tenth. Among the continents Europe ranks only fourth in size, yet on account of its dense population and advanced civilization it is the most important of all. With only about one-fourteenth of the land-surface of the earth it is the home of nearly a quarter of the human race, being peopled twice as densely as Asia. This is to be ascribed largely to the remarkable advantages of position and climate which the continent enjoys. Western Europe is the centre of the great land-masses of the globe, and has free sea communication with all the more productive parts of the world. We have seen (§ 183) that if the surface of the earth be divided into two hemispheres, one of which contains the largest possible extent of land, the centre of that hemisphere will be in the south of France, very near to the town of Bordeaux. Europe is, moreover, almost entirely in the temperate zone, and the genial influence of the Gulf Stream and the warm south-west winds that blow from the Atlantic are felt over the western part of the continent and as far north as Norway. It is thus subject neither to the enervating heat of the tropics, nor to the numbing cold of the arctic regions, and, in most parts it enjoys a fair rainfall. In all ways, therefore, Europe furnishes the human race with ideal conditions for steady and uninterrupted development.

553. Boundaries and Coast Line. There is no natural boundary line between Europe and Asia save the **Ural Mountains** south from the Kara Sea and the **Ural River** onward to the Caspian. The political boundary does not follow this line, however, but as it lies wholly within the Empire of Russia it

is of little moment. In the south-east it follows the course of the Ural River as far as the town of **Orenburg**, and then runs irregularly west and south till it reaches the **Caspian Sea** about midway between the mouths of the Ural and the Volga. From this point the Caspian forms the boundary as far as **Cape Apsheron**, whence the **Caucasus Mountains** run in almost a straight line to the **Sea of Azov**, forming a high natural rampart in the south-east. Politically, however, Europe stretches beyond this range, the Trans-Caucasian Province being reckoned a part of European Russia. West of the Caucasus the boundary is formed by the **Black Sea**. The **Straits of Bosphorus** the **Sea of Marmora**, the **Dardanelles**, or **Hellespont**, and the **Ægean Sea**, or **Archipelago**, divide the Balkan Peninsula from Asia Minor. The **Gulf of Salonika** in Turkey and the **Gulf of Ægina** in Greece are the most important arms of the Archipelago. From **Cape Matapan**, the most southerly point of Greece, the coast runs north-west to the **Straits of Otranto** which connect the **Ionian Sea**, in the south, with the **Adriatic**. The north of the Adriatic receives the waters of the Po, which drains the southern slopes of the Alps. This river brings down so much silt that the land is encroaching on the sea and the northern part of the Adriatic becoming shallower. Ravenna, which once was a seaport, is now 4 miles inland. To the west of Italy is the **Tyrrhenian Sea** into which flows the Tiber, the most famous of Italian rivers. The **Gulf of Genoa** north of the island of Corsica, and the **Gulf of Lions** south of France, are important arms of the **Mediterranean**, an inland sea which separates Europe from Africa and communicates with the Atlantic only through the narrow **Straits of Gibraltar**.

554. The **Mediterranean** is a sea of vast extent, and in parts has a depth of over 2,000 fathoms. Although many large rivers flow into it evaporation from its surface reduces its volume more rapidly than the rivers increase it. Its waters are therefore saltier than those of the ocean. There is a steady surface-current of fresher water flowing into it through the deep Straits of Gibraltar, and, owing to the greater density of salt water, an under-current flows out into the Atlantic. Many of the great Empires of antiquity grew up around the Mediterranean, and until the discovery of the Cape of Good Hope route to the east, and of the two Americas, it was the highway of the chief commerce of the world. The

eastern trade was carried on both by the Red Sea route and by caravan through Central Asia, and whatever Mediterranean port formed its chief emporium speedily became rich and powerful. **Tyre, Alexandria, Genoa, Venice** and other cities owed their wealth and importance to the fact that at different periods they were the European centres of this trade. The discovery of the Cape route to the east largely diverted the eastern commerce to the Atlantic ports of Europe, especially those of Spain, Portugal, Holland and Britain. The discovery of America, moreover, gave birth to a western commerce destined to eclipse the eastern both in bulk and value, and in which the Mediterranean cities had at first little share. This still further increased the importance of the western ports and led in time to a transfer of wealth and power from the Mediterranean to the Atlantic States of Europe. Of recent years the opening of the Suez Canal has made the Mediterranean once again the chief route of the eastern trade, and as the mountain systems of Central Europe do not, like the Himālayas in Asia, offer any serious barrier to commerce, and railways now connect every State in Europe with the Mediterranean seaboard, its northern ports are again increasing in wealth and influence.

555. The **North Atlantic** forms the boundary of Europe on the west from **Gibraltar** in the south to the **North Cape** in Norway. West of the Straits of Gibraltar the coast-line runs north-west and west to Cape St. Vincent, the most southerly point of Portugal, then north to the magnificent **Bay of Tagus** on which stands Lisbon, the beautiful capital of Portugal. **Cape Roca**, a few miles west of Lisbon in Long. 9° 30' W., is the most westerly point of Europe. Northward the coast is broken only by the mouth of the **Douro** (on which stands the city of Oporto which gave the country its name) till the little river **Minho** is reached, which marks the northern boundary of Portugal. Here the unbroken coast-line ends, and a series of deep indentations, with narrow rocky bays, called *rías*, which cut far into the land, extend past **Cape Finisterre** the most westerly to **Cape Ortegal** the most northerly point of Spain. From Cape Ortegal the coast runs eastward at the foot of the **Cantabrian Mountains**, a continuation of the Pyrenees. The waters of the broad and often stormy **Bay of Biscay** wash the northern coast of Spain and the western coast of France. Into

it flow from the French lowlands (here called *Landes*) the **Gironde** and, further north, the **Loire**, both rivers of great commercial importance. From the mouth of the Gironde the coast runs north-west and is fringed by a number of sandy islands of which the most important is **Belle Isle**. **Brest**, on the northern of the two deep bays that cut into the projecting nose of **Brittany**, is a strongly fortified naval harbour, the Portsmouth of France. North of it is **Cape Ushant**, the most westerly point of France, from which the coast runs eastward till it reaches the base of the peninsula of **Cotentin** in Normandy, which stretches northwards into the English Channel, and ends in **Cape de la Hague**. West of the peninsula lie the **Channel Islands** which, though geographically belonging to France, are politically British possessions. East of the peninsula is the bay into which the river **Seine** discharges, and for 150 miles further east the coast of France, like the opposite coast of Britain, consists mainly of high chalk cliffs rising abruptly from the sea. At **Cape Gris Nez** in the **Straits of Dover** France approaches most nearly to the **British Isles**, a group of islands standing on the *continental shelf*, which here juts out 500 miles into the Atlantic.

556. North-east of the Straits of Dover the coasts of **Belgium** and **Holland** are low and flat, and dunes of sand washed up by the sea, or blown inland by the winds, form natural dykes that keep out the sea. The **Scheldt** and the **Meuse** from Belgium and the **Rhine** from Germany enter the **North Sea** in **Zeeland**, the island-province of Holland. The whole of this province and the coastal districts of Holland as far north as the **Zuyder Zee** are below sea-level. The narrow **Peninsula of Jutland**, which divides the Baltic from the North Sea and includes the **Kingdom of Denmark** and the German province of **Schleswig-Holstein**, is nowhere more than a few feet above sea-level. The **Skager Rack**, an arm of the North Sea, separates **Jutland** from **Norway**, and, east of the **Skaw**, the most northerly point of Denmark, the **Kattegat** forms the division between **Denmark** and **Sweden**. South of the **Kattegat** is **Zealand** the largest Danish island, between the **Sound** and the **Great Belt**—channels which connect the Baltic with the North Sea. The **Baltic** is one of the chief European inland seas. Being cut off from the influences of the **Gulf Stream** it is much colder than the North Sea. It receives

from the drainage of Sweden and Russia far more water than it loses by evaporation, and there is almost always an outflow into the North Sea. The waters of the Baltic are therefore much less salt than sea-water generally is, and consequently freeze more readily. The **Gulf of Bothnia**, between Sweden and Finland, and the **Gulfs of Finland** and **Riga** in the east are the principal arms of the Baltic. The west coast of Norway is deeply indented with narrow rocky bays or **fjords**. Some of these are so narrow, and the confining walls of rock so steep and high, that the sunlight never reaches the water, and most are deep enough for large vessels to enter them. Hundreds of islands, large and small, stud the coast. The largest of these are the **Lofoden Islands** in the north-west. **North Cape** is the most northerly point of Europe. About 500 miles south-east is the entrance into the **White Sea**, a large arm of the **Arctic Ocean**. Into the White Sea flows the **Dwina**, at the mouth of which stands **Archangel**, the most important town of Arctic Russia.

557. Surface. An immense plain stretches from the Black Sea to the Arctic Ocean, broken only by the low **Valdai Hills** lying to the south-east of the Gulf of Finland. In the north-west this plain extends along the east of Sweden and includes the whole of the large peninsula south of Stockholm and Lake Wener. From Odessa on the Black Sea it stretches northward, skirting the **Carpathian Mountains**, then turning westward, sweeps in a semi-circle as far as the Bay of Biscay. This great plain forms about two-thirds of the continent, including the whole of Russia, part of Sweden, Denmark, North Germany from the Vistula to the Rhine, Holland, Belgium, the south-east of England and the north and west of France.

558. Two large systems of great elevation occupy the north-west and the south of Europe respectively. The former stretches through the western half of the **Scandinavian Peninsula**, **Scotland**, the west of **England** and **Ireland**, and extends as far as **Normandy** and **Brittany** in France. These highlands are mainly composed of very ancient crystalline rocks, and have formed a land-area from the remotest geological ages. The other, and by far the most important, has its centre in the **Alps** which are the highest mountains in Europe, though they do not cover the largest area. The Alps extend

EUROPE IN RELIEF.



Fig. 112.

from the Gulf of Genoa in the Mediterranean to the Hungarian plain. North and south of the central axis, which is mainly crystalline, stretch broad belts of lower elevation composed chiefly of limestone. These are often called the "fore-alps," and in them are situated the large Alpine lakes—**Geneva, Lucerne, Constance** and others in Switzerland, and **Maggiore, Como and Garda** in Italy. The **Western Alps** stretch southward from the **Great St. Bernard Pass**. They

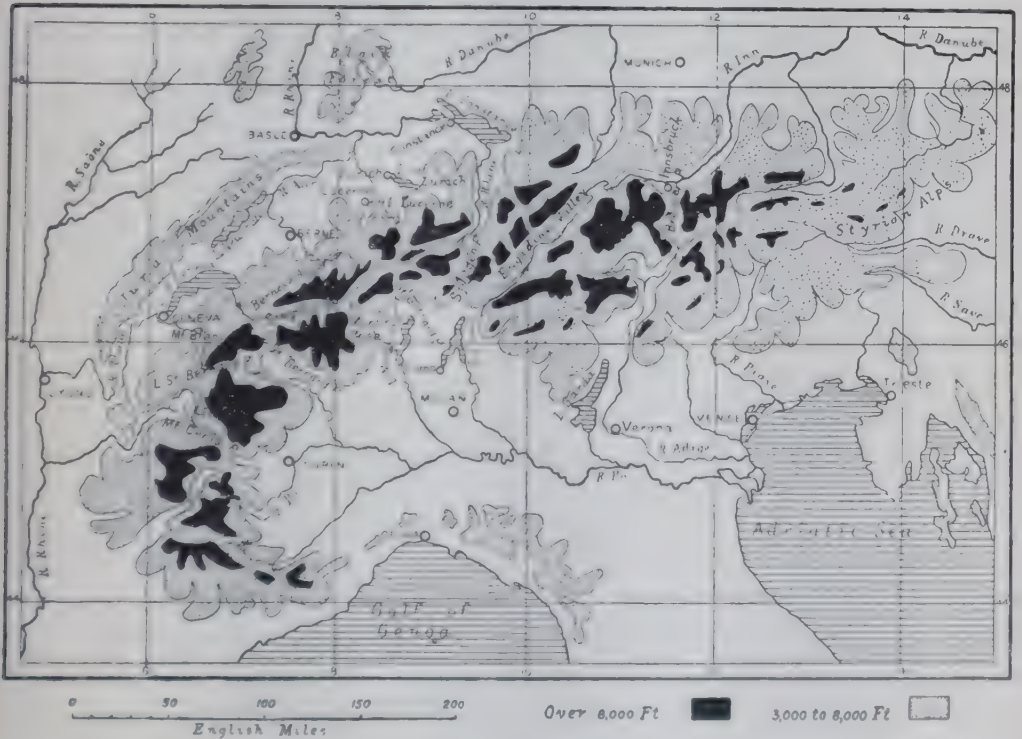


Fig. 113. The Alps, showing the drainage and the chief passes.

include **Mont Blanc**, 15,784 feet high, and the famous **Mont Cenis Pass**, 6,835 feet high. From the **Great St. Bernard** eastward stretch the **Central Alps** as far as the **Brenner Pass**. The **Bernese Alps**, **Monte Rosa** and the **St. Gotthard** group belong to this section, also the passes of the **Simplon**, **St. Gotthard** and **Splügen**, and the lovely **Engadine valley**. The **Eastern Alps** stretch into the heart of Austria and include the long **Styrian** chain and the **Semmering Pass**. From the Alps radiate the other large mountain chains of South

Europe, the **Balkans** in the Danubian principalities and Turkey, the **Apennines** in Italy, the **Jura**, **Cevennes** and **Vosges** in France, and the **Carpathians** in Austria-Hungary.

559. The mountain-system of South Europe is a continuation of the northern chain of fold-mountains radiating from the Pamir Plateau in Central Asia which we have already traced as far as the Caspian (see § 200). The **Caucasus** forms, as it were, the bridge connecting the European and the Asiatic systems. The **Ural Mountains**, between Russia in Europe and Siberia, are a long chain of crystalline rock of very varying width, higher in the north and south than in the centre, but nowhere exceeding 6,000 feet. In the north they bend round to the west and, dipping under the water, re-appear in the island of **Nova Zembla**. The **Pyrenees** extend as a long chain from the Gulf of Lions to the angle of the Bay of Biscay and continue as the **Cantabrian Mountains** to the north-west corner of Spain. South of this mountain chain lies the extensive **Iberian Plateau** which occupies almost the whole of the Spanish peninsula.

560. **Drainage.** The Valdai Hills, though scarcely more than 1,000 feet in height, form the principal water-shed of Eastern Europe. On their slopes rise most of the important rivers of Russia. The **Volga**, the longest river of Europe, has its source in these hills and, after a winding, sluggish course of 2,200 miles, enters the Caspian Sea by 16 mouths. The **Neva** and **Düna** flow into the Baltic, the **Onega** and **Dwina** into the White Sea. The **Dnieper** and **Don** flow into the Black Sea, as also does the **Dniester** which rises on the northern slopes of the Carpathians. The **Petchora**, flowing into the Arctic Ocean, and the **Ural River**, flowing into the Caspian, have their rise on the Ural Mountains. Most of the Russian rivers are navigable for the greater part of their course, and in many places they are connected by canals. There is a continuous water-way from the Baltic to the Caspian through a canal which joins the Neva with the Volga.

561. The great rivers of Central Europe rise in the mountain chains, and draining large areas of abundant rainfall bring down a vast quantity of water and are navigable throughout their whole course across the plains. The **Vistula** and **Oder** flow into the Baltic, the **Elbe**, **Weser**, and **Rhine** into the North Sea. All these are of great commercial importance because of the

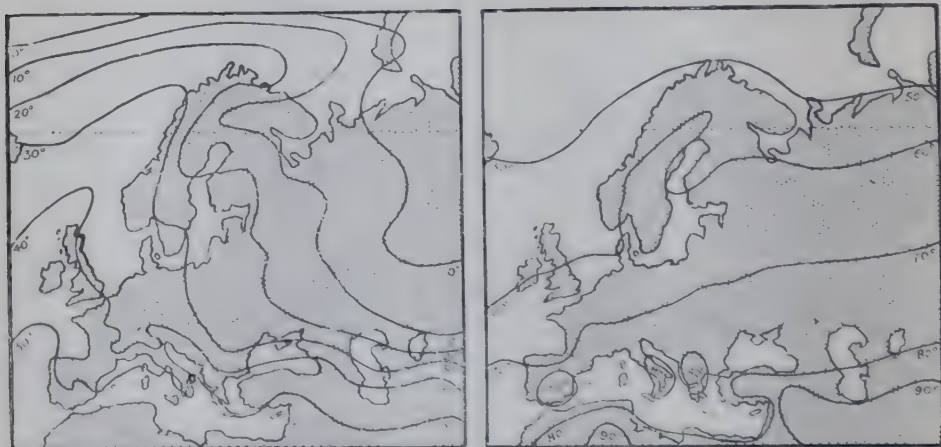
busy centres of industry that have grown up on their banks. Especially is this the case with the Rhine which, with its large tributaries the **Moselle** and the **Main**, is the great water-way of Western Germany. The **Seine**, **Loire**, and **Garonne** are the three great rivers of the French plain. The first flows into the English Channel, the two last into the Bay of Biscay. The **Rhone**, like the Rhine, rises in the St. Gotthard group of the Alps. After passing through **Lake Geneva** it makes its way westward to the small **Plain of Burgundy**, where it receives the waters of the **Saône** and then flows south to the Gulf of Lions. The Plain of Burgundy, which the Saône drains, is separated from the valley of the Rhine only by a low gap between the Vosges and the Jura Mountains known as the **Burgundian Gate**. The two river valleys thus give an easy route from the Mediterranean to the heart of Germany and onwards to the North Sea, a route which has been of vast importance in the history of Europe.

562. The **Danube**, the largest river of Central Europe, flows south-eastward from the Black Forest in Germany, draining with its tributaries the Eastern Alps and the south-western slopes of the Carpathians. From Vienna it flows for 400 miles through the plain of Austria-Hungary, and then passes through the "**Iron Gate**" into the Plain of Wallachia. The Iron Gate is a rocky channel between the Carpathians and Balkan Mountains which greatly impedes navigation. A canal has been cut in the rocky bed through which steamers of 2,000 tons can pass, though not without danger. Above the Iron Gate the river is freely navigable for 700 miles, below it it flows eastward for 300 miles to the Black Sea. In this last part of its course it forms the boundary between Roumania and Bulgaria, and by an agreement between the Great Powers it is an international highway open to the ships of all nations. The Danube has played an extremely important part in the history of Europe. Along its valley the Huns swept westwards, and in the opposite direction German civilization has spread to the Iron Gate.

563. The **Tiber**, in Italy, runs a short but rapid course into the Tyrrhenian Sea. It is navigable for steamers of small draught as far only as Rome. The most important river of Italy is the **Po** which, rising in the Alps, receives most of its tributaries from them and flows eastward into the Adriatic.

564. Of the many long rivers of Spain only the **Guadalquivir**, which rises in the mountains of Andalusia, is a perennial one, and it is therefore the only one really navigable. It flows into the Atlantic, as also do the **Guadiana**, the **Tagus** and the **Douro**. The **Ebro** rises in the Cantabrian Mountains and flows into the Mediterranean.

565. **Climate.** The climate of Western Europe is greatly influenced by the **Gulf Stream Drift** which washes the north-western shores with comparatively warm water, and makes the prevailing south winds mild and genial water-bearing currents. How great this influence is may be seen from the temperature charts which show how the warm current bends the isotherms to the north, moderating the cold even in the White Sea and everywhere west of Nova Zembla. The range of temperature all over Western Europe is therefore very low, neither the



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JULY.

Fig. 114. Showing the Winter and Summer Isotherms.

heat in summer nor the cold in winter being extreme. Inland the moderating influence of the south-west winds is gradually lost, and towards the east the climate of Central Europe becomes distinctly continental in character. In East Russia the extremes of heat and cold are very great, and while the ports of Norway are open all the year round, those of the Sea of Azov, in latitude 25° further south, are sometimes closed by ice. The broad and unprotected northern plain experiences the full effect of the keen Arctic winds. The rainfall is fairly ample over the greater part of Central

Europe. It is heaviest along the west of the British Isles and Norway, where the warm south-west winds first deposit their moisture, and along the central mountains. The Iberian Plateau, the north of Sweden, Lapland, and the greater part of Russia, receive a poor supply. There is no special rainy season.



Fig. 115. Average Annual Rainfall of Europe.

566. Natural Products. *Wheat, rice, maize, the sugar-cane, tobacco, the vine, the orange, and the olive,* are cultivated in the south, and there are forests of *cork and chestnut* trees. The vine grows in the warmer parts of the central regions, but cornfields and green meadows form the leading feature in the vegetation. *Potatoes* are abundant; *fruits* are numerous and varied. *Hemp* and *flax* are largely cultivated in the centre and east. *Barley* and *rye* are raised in the north and there are

extensive forests of *pine*. In central Europe there are valuable forests of *fir*, *birch*, *larch*, *oak*, *poplar*, and other trees; and in some countries, especially Germany and France, scientific forestry has been carefully studied. In Great Britain forestry has been neglected, but steps are now proposed to remedy the evil. While in Germany and Austria-Hungary nearly 30 per cent. of the total area is under forest, the percentage in Great Britain is only $3\frac{1}{2}$. The fisheries in the north are very productive; vast quantities of *herring* and *cod* are caught, and fish of many other kinds. The *salmon* is found in many of the northern rivers, and the *sturgeon* in the Danube and Volga. The *silkworm* is reared in the south. *Iron*, *lead*, *copper*, *tin*, *mercury*, *coal*, and *salt* are the principal mineral productions. They are chiefly found near the base of the hills in Scandinavia, Britain, Germany, Austria, Spain and Russia, where the more ancient rocks crop out.

567. People. The population of Europe is nearly 400 millions of whom 95 per cent. belong to the Aryan branch of the great **Caucasian** family. The earliest inhabitants of Europe seem to have been rude **Mongol** tribes. The **Basques** of the Pyrenees and the **Lapps** are now their only representatives. The **Celts** were the first Aryans to enter Europe. At one time they spread over a great part of the continent, but are now found only in the west. They include the Irish, Welsh, many of the Scotch, and the Walloons of Belgium, and form the largest ethnic element in the mixed races of Western France. They were followed by the **Romanic** peoples, who drove the Celts before them as the Celts had driven the Iberians or Basques. Among them were the ancestors of the Greeks and Romans, who became the most civilized nations in Europe. The Italians, the Spaniards, and most of the French belong to the Romanic group which now numbers about 110 millions. The next Aryan immigrants were the **Teutons**, a taller and fairer race. They took a more northerly course, driving the Celts still further westward. The Teutonic family now includes Germans, English, Swedes, etc., and numbers about 140 millions. The last Aryans who entered Europe were the **Slavs**, who took a still more northerly course, and spread over the plains and forests of Russia. Their descendants, the Russians, Poles, etc., now number about 120 millions. The Hungarians, the Finns, and the Turks are **Mongolians** who

entered Europe after the Aryans. Including Jews, the non-Aryan peoples of Europe number 19 millions. The languages spoken by Caucasians in Europe belong, like the vernaculars of North India, to the Aryan family. They are divided into four classes, like the nations themselves—**Teutonic**, **Slavonic**, **Romanic**, and **Celtic**. Russian, German, French, English, and Italian are spoken by the greatest numbers. Nearly all the inhabitants of Europe are Christians. The Romanic peoples belong chiefly to the **Roman Catholic Church**, the Slavs to the **Greek Church**, and the Teutonic peoples to the various **Protestant Churches**. There are about 7 million **Muhammadans** and about 5 million **Jews**.

563. Political Divisions. The following are the principal States of Europe with their area, population, and government.

Name	Government	Area in thousands of square miles	Population	
			In millions	Per sq. mile
GREAT BRITAIN AND IRELAND	Limited Monarchy	121.3	41.9	345
FRANCE	Republic	207.0	38.9	188
SWITZERLAND	"	15.9	3.3	207
GERMANY	A federation of States under a limited Monarchy	208.8	56.4	270
AUSTRIA-HUNGARY	"	265.0	47.0	177
RUSSIA-IN-EUROPE	Nominally Limited Monarchy	1,996.7	107.4	35
ITALY	Limited Monarchy	110.5	32.4	293
SPAIN	"	194.7	18.6	97
PORTUGAL	"	35.4	5.4	152
NORWAY	"	124.4	2.2	18
SWEDEN	"	172.8	5.1	30
DENMARK	"	15.3	2.4	160
HOLLAND	"	12.6	5.5	436
BELGIUM	"	11.3	6.6	589
ROUMANIA	"	50.7	5.9	116
BULGARIA	"	37.2	3.7	100
SERVIA	"	18.6	2.4	134
TURKEY-IN-EUROPE	Absolute Monarchy till 1908, when a Constitution was granted	65.3	6.1	94
GREECE	Limited Monarchy	25.0	2.4	9

THE BRITISH ISLES

569. **THE BRITISH ISLES** consist of the larger islands of **Great Britain** and **Ireland** with groups of smaller islands on the north and west. The entire group is strictly continental, standing on the continental shelf which here juts out from the western coast of Europe as a vast partially submerged peninsula. If the level of the surrounding seas were to be reduced by 600 feet this peninsula would again be land, and the British Isles would form a central area of moderate highlands. Ireland was separated from Great Britain for long ages before Great Britain itself became an island. Geologically the Straits of Dover are very recent. The vast chalk beds, which extend over a great part of south-east England and the neighbouring parts of the continent, stretched once in unbroken continuity where the sea now flows.

570. **Structure.** Geologically the British Isles must be regarded as a continuation of the Scandinavian peninsula. The massed crystalline rocks of which the mountain system of Norway is composed re-appear in the Highlands of north-west Scotland and in the north-west and west of Ireland, where also there are large areas of red sandstone and other early palaeozoic rocks. These have all apparently been land-areas from the very earliest geological periods. By long ages of weathering the rocks have been carved into innumerable ridges, and deep valleys have been cut mostly running from north-east to south-west. Since the excavation of the valleys there has been a considerable subsidence on the west, and the valleys, having been partially flooded, form deep and narrow arms of the sea. In many places among the Archaean rocks irruptions of igneous rock have occurred filling up vast cracks and fissures and sometimes spreading itself out over wide areas. To this fact is largely due the rich variety of contour which is found in many parts, and particularly in the Highlands of Scotland, the Lake District of England, and the south-west of Wales and Ireland, the hard granite weathering more slowly than the rocks in which it is bedded.



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Fig 116 Geological Outline
 (For section and column 11; see next page)

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571. South-east of the more ancient areas the geological structure of the British Isles is exceedingly complicated. Rocks of almost every geological age are found at the surface at one place or another. In England the uniform dip of the strata is to the south-east, older and older rocks coming to the surface as we travel from the mouth of the Thames to north-west Wales. The weathered edge of each formation is towards the north-west or west, and forms a sharp drop in the level of the land, while a gentle slope on the other side indicates the dip of the layer, and runs away to the south-east and east.

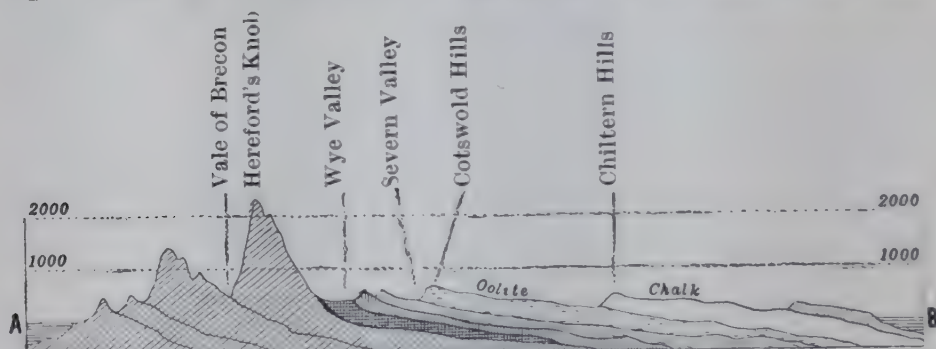


Fig. 117. Section across England along the line A B on Fig. 116 (lat. 52° N.), showing height in feet above sea-level.

From the north-east coast of Yorkshire, a belt of **Oolite** (so-called because the limestone of which it is chiefly composed is granular and resembles the roe of a fish in structure—Gr. *ōon* an egg), runs south-westwards to the coast of Dorset. The oolite escarpment, i.e., the weathered edge of the formation along its western margin, forms a line which practically divides agricultural England on the south-east from mining and manufacturing England in the north and west. The mineral wealth of England, especially its coal, is chiefly found where the older rocks crop out. East of the oolite very little coal is obtained, and as an abundant local supply is necessary for the development of any great manufacture, the industrial centres of England are all west of this line. Not less striking is the contrast in the scenery east and west of the oolite escarpment. The harder ancient rocks, often strengthened by masses, or injected columns, of igneous rock, weather slowly, and the country is accordingly rugged and mountainous, and often exhibits abrupt declivities where vast cleavages have taken place in remote geological ages. East of the line the landscape

is softer, with gentle, rounded, well-wooded slopes along the oolite belt, passing, where the oolite dips beneath the chalk, into undulating and comparatively treeless downs.

572. In Scotland the great mass of the rugged northern highlands is separated from the southern uplands of grassy hills by a broad plain running east and west from sea to sea. This is a "rift valley," a sharp and deep depression of the earlier surface, now largely filled with rocks of later formation. In Ireland the ancient rocks of the north-west give way to red sandstone and limestone in the south-west and south. The north-east corner is a comparatively recent volcanic plateau probably of the same age as the Scottish islands of Mull, Eigg, Rum, and Skye, which, with the most westerly part of the

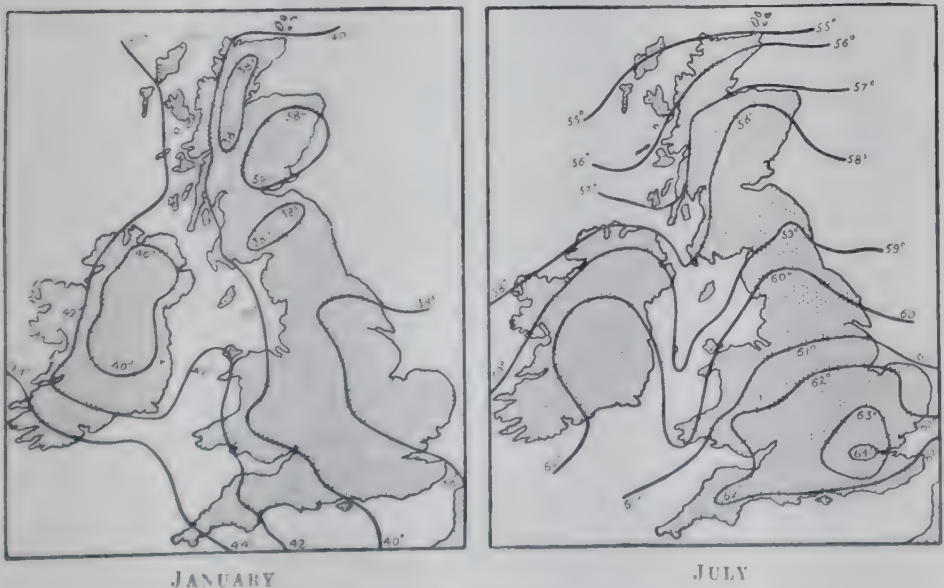


Fig. 118 Showing the Winter and Summer Isotherms.

mainland, are also of volcanic origin. The interior of Ireland is a low plain where the weathered products of the hills have for ages accumulated, and where there are many deep bogs often showing several layers of half-carbonized ancient forests (see § 75). The very varied geological character of the British Isles confer upon them unusual mineral wealth.

573. Climate. The British Isles extend from about 50° to 59° N. Lat., the same latitude as the bleak and ice bound plateau of Labrador, and a little further north than the desolate island of Sakhalin, east of Asiatic Russia. The maximum

summer temperature of Labrador and Sakhalin differs little from that of Britain, but in winter the difference is immense. The British Isles have an average winter *minimum* of 21°F.

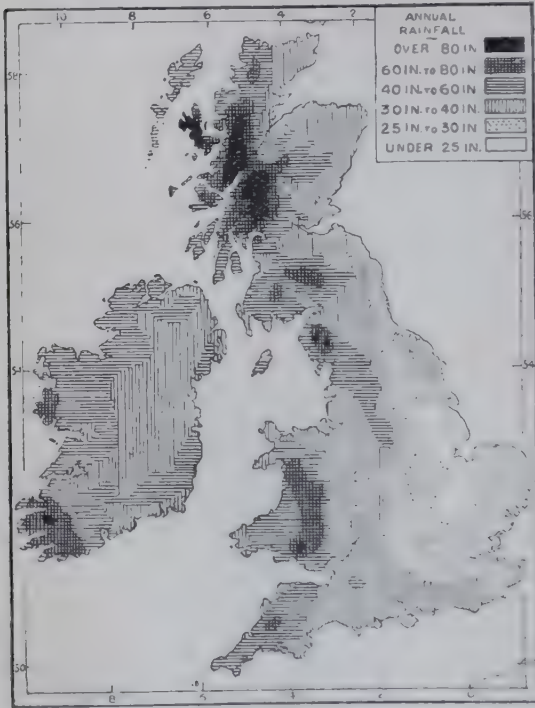


Fig. 119.

The Average Annual Rainfall of Britain.

but it is very rarely that the thermometer falls to 0°F. in any part of the British Isles. The average range of temperature is indeed very small, but increases from west to east.

574. The rainfall is greatest over the western highlands of Scotland, the south-west corner of Ireland, the mountainous regions of Wales, and the Lake District of Cumberland, where the average fall is over 60 inches a year; but it is fairly heavy all over the entire western half of both islands. The driest part is along the eastern coast of England, especially between the Humber and the Thames, and inland to the valley of the Severn, where in places the rainfall is as little as 22 inches. Fig. 119 shows the actual distribution. The heavier rainfall in the west and south is due to the fact that the south-west winds come up from the warm ocean charged with moisture which they shed as soon as they touch

while that of Labrador is -23°F. and that of Sakhalin -31°F., a difference respectively of 44° and 52°F. This great difference in favour of Britain is due mainly to the genial influence of the Gulf Stream Drift which washes its western shores, and to the prevailing south-west winds which for two days out of every three blow as soft breezes from the warmer ocean. When north or east winds blow the climate of Britain is drier and cooler, and in winter these winds are sometimes keen and biting,

the colder land, becoming drier and drier as they cross the island. The east winds also blow from the sea, but being much colder their vapour-bearing power is less. At most seasons of the year, moreover, they are warmed rather than chilled by contact with the level plains, and their vapour-bearing power being increased they *take up* water instead of depositing it. Along the east coast therefore east winds are generally accompanied by a clear sky and a dry air, while on the western hills they not unfrequently bring rain.

575. People. Great Britain has been peopled by two branches of the great Aryan family, the **Celts** and **Teutons**. There were no doubt still earlier inhabitants who were probably allied to the Basques of the Pyrenees, but of these we have no certain knowledge. The Celts, pressed westwards by the conquering Teutons, seem to have come to England in two separate groups, speaking different dialects. First came the **Gaels** who conquered, and probably united with, the more ancient people of the land. After them, but how long after it is impossible to tell, came the **Cymri**, or Britons, who drove the Gaels west and north and occupied the greater part of England. In those early days the country was mainly covered with dense forests and marshes. Early in the Christian era the Romans conquered Britain and held it for three centuries. The Romans did not, however, unite with the conquered people. They introduced a large measure of civilization, and many of the great roads which they constructed still remain, as well as the ruins of numerous camps, baths, etc., but when they abandoned the country they left few traces of Roman blood. During the next two or three centuries various Teutonic races settled in the land. The **Jutes**, the **Saxons**, and the **Angles** established themselves in the east and south, and the **Danes** followed them. The Celts were gradually driven further and further westward. After the conquest of England by William of Normandy, there was a large influx of **Normans**, descendants of **Scandinavian** settlers in northern France. From these various elements the people of Britain have come. The Angles and the Saxons, of the **Low German** stock, predominated, and the Anglo-Saxon language became the basis of modern English. The Gaels were driven westward to Ireland whence, about A.D. 300, a Gaelic tribe, called **Scots**, crossed to Caledonia and, subduing the ancient inhabitants called **Picts** by the Romans, gave the

country its new name, *Scotland*. Angles and Scandinavians subsequently settled in the eastern and central districts, and from these three races the modern Scots have descended. Gaelic languages still survive in the west of Ireland and the highlands of Scotland. The Cymri held their own in Wales, and their language survives in modern Welsh.

576. Government. England, Wales, Scotland and Ireland now form the **United Kingdom of Great Britain and Ireland**, but the full union is a fact of comparatively recent history. Ireland was conquered by Henry II. in 1172. Previous to this time the island was divided into four small kingdoms that were continually at war. It had a separate Parliament till its complete union with Great Britain in 1801. Wales was conquered by Edward I. in 1282 and finally incorporated with Great Britain in the 16th century. Scotland was never conquered. Attempts to reduce it only resulted in disaster to England, and placed the independence of the northern kingdom on a firmer basis. But James VI. of Scotland succeeded to the English throne in 1603 becoming James I. of England, and the Parliaments of the two countries were finally united in 1707.

577. The **Parliament** of the United Kingdom consists of two Houses, the **Lords** and the **Commons**. The members of the House of Lords are Peers who sit by hereditary right, together with a certain number of elected Scotch and Irish Peers, 2 Archbishops and 24 Bishops. The House of Commons is composed of representatives elected by the people. All laws require the consent of both Houses of Parliament and of the Sovereign, but the House of Commons has sole authority over all matters of taxation and expenditure. For purposes of local government there are (1) **County Councils**; (2) **City, Borough, and Town Councils**; and, in the country districts (3) **Parish Councils**. These are all representative bodies and have charge of purely local matters. They have power to raise money for public purposes by rates levied on property within their area.

578. Elementary education is free and compulsory, and in England is under the control of the County authorities. For secondary education there are more advanced schools under the same authorities, as well as technical schools of all kinds. The great public schools at **Eton, Harrow, Rugby, Winchester**, etc., and the numerous "**Grammar Schools**" scattered up and down the country, some of which have considerable endowments and an ancient history, are intended chiefly for the better classes, and many of them are costly. The ancient **Universities** of **Oxford** and **Cambridge** date respectively from the 12th and 13th centuries and have many colleges. Younger and much smaller universities are situated at **Durham, London, Manchester, Birmingham, Liverpool, Leeds, and Sheffield**. In general

education Scotland has for centuries been ahead of England, and has an excellent system of schools. The **Universities** of **St. Andrews**, **Glasgow**, and **Aberdeen** were founded in the 15th century, that of **Edinburgh** in the 16th century. The **University of Wales** has its seat at Aberystwith. In Ireland the **University of Dublin** was founded in the 16th century by Queen Elizabeth, and the **Royal University of Ireland** in 1880. As the great majority of the people of Ireland are Roman Catholics, and the Dublin University is a Protestant foundation, an Act was passed in 1908 dissolving the Royal University and in its place establishing two universities, one at Dublin and one at Belfast, in which no religious tests are allowed.

579. The **Army** of England is small when compared with the vast forces of most continental states. In an island country a large army is not needed. The total **Regular Forces** number little more than a quarter of a million, and at all times many of them are on service abroad. In addition there is a **Territorial Army** under training for a part of each year only, and numbering in all about half a million. On the other hand Great Britain has an immense **Navy**. The very circumstances which render a large *army* unnecessary make it absolutely essential that her *navy* should be supreme. Britain has vast colonial possessions and immense and world-wide commerce. Her fleet must, therefore, be sufficient to guarantee the safety both of her colonies and her ships.

580. The **Foreign Trade** of the United Kingdom is enormous, and far exceeds that of any other country. In 1907 it amounted to 1,072 millions sterling of which 646 millions were imports and 426 millions exports. Next in order come Germany and the United States with 700 and 663 millions respectively. In addition to this a large part of the "carrying trade" between foreign countries is in British hands, and ships that sail under the British flag constitute one-half of the entire mercantile marine of the world. The **imports** of Great Britain are mainly *food-stuffs*, *raw material* for her manufactures, and *articles of luxury*; and the **exports** *manufactured goods* and *coal*.

581. **Communications.** The inland communications of the United Kingdom are very abundant. Railways connect all the great towns and radiate in all directions from the larger centres of industry. There are now over 23,000 miles of railway open. Commerce is also greatly facilitated by the long coast line which enables coal to be carried cheaply from the coastal coalfields to almost every part of the Kingdom. There are in the United Kingdom 150,000 miles of road, mostly well metalled, and 7,000 miles of inland navigation by canals and rivers. From the larger ports ocean going steamships give regular and cheap communication with all parts of the world, so that London, Liverpool, and Southampton have become the great ocean junctions, the centres to which all lines converge.



Fig. 120. Railway Map of the British Isles.

ENGLAND AND WALES.

582. ENGLAND AND WALES form the southern part of the island of Great Britain. They are bounded on the north by Scotland, on the east by the North Sea, on the south by the English Channel, and on the west by St. George's Channel and the Irish Sea. The general shape is triangular, but the coast, especially in the west, is diversified by many bays and promontories. The greatest length is 420 miles, and the greatest breadth 320 miles. The total area is 58,300 square miles.

583. Coast Line. England is separated from Scotland on the north-west by the **Solway Firth**, in which the tides run swift and high. The rounded coast of Cumberland runs south-west, with high cliffs facing the sea to **St. Bees' Head**, and then turns south-west and south. Beyond the port of **Barrow-in-Furness**, which is protected by a narrow island, **Morecambe Bay**, a shallow expanse of mud and sand, stretches into the land. South of this, till the cliffs of North Wales are reached, the shore is low and sandy and in some parts covered for miles inland with low sand-dunes. It is broken by the estuaries of the **Ribble**, the **Mersey**, and the **Dee**. On the Mersey is the great port of **Liverpool**, the second in the Kingdom. Beyond the Dee the coast continues low till the rocky headland of **The Great Orme** is reached. Further west the island of **Anglesey** is a vast block of ancient rock, with the smaller **Holy Island** to the west. The channels separating these islands from each other and from the mainland are so narrow that both are bridged, and the mail trains for Dublin run without a break from London to Holyhead, whence steamers cross the Channel to Dublin and Kingstown. Southward from Anglesey three great promontories stretch in a south-westerly direction into St. George's Channel or the Atlantic. These are **Carnarvon**, **Pembroke**, and **Cornwall**. They are all composed mainly of ancient crystalline rocks, against which the south-western storms beat in vain. Between Carnarvon and Pembroke is the rounded sea-carved **Cardigan Bay**, an exposed arm of the sea with little shelter for shipping. At the south-west extremity of Pembroke is **Milford Haven**, cut far into the rocky land, and forming the finest natural harbour in Britain.

Unfortunately it is at a distance from the great centres of production and trade, and is therefore but little used. South of Wales is the **Bristol Channel** with the highest tides in England. The important ports of **Swansea**, **Cardiff**, and **Newport** are on its northern shore, and **Gloucester** is far up the shallow estuary of the Severn. On the south of the Channel, ten miles up the estuary of the **Lower Avon**, stands the ancient port of **Bristol**, once the chief port for the West Indian and American trade, and now regaining something of its former importance through the construction of large docks at **Avonmouth**.

584. Along the northern coast of the southern promontory are no ports of any consequence. In parts there are long stretches of low sandy shore, but as we go further west the coast becomes rocky, and from its most northerly point to Land's End it presents a stretch of wild and varied beauty unequalled by any other coast-line in the Kingdom. At the extreme south **Land's End** and the **Lizard** shelter the beautiful **Mount's Bay** in which stands the little seaport of **Penzance**. The extremity of each of the three great western promontories is fringed by numerous rocky islands, of which none are of any moment save the Scilly Islands off Land's End, which are noted for their mild and equable climate. Vast quantities of flowers are grown here for the London market, and a daily steamer plies to the islands from **Penzance**.

585. The southern coast of Great Britain runs on the whole east-north-east from the **Lizard** to the **Straits of Dover**, and is very varied in character. Bold and rocky headlands alternate with sheltered, sandy bays. Owing to the southern exposure the climate is mild and warm, especially when protected from the east winds, and accordingly a large number of watering-places have sprung up which are crowded by visitors in the spring and autumn when the northern resorts are too cold. Along the coast there are many natural harbours some of which are of the greatest importance. Such are **Plymouth Sound** in the west, and **Portsmouth** and **Southampton** north of the **Isle of Wight**. Plymouth and Portsmouth are great naval stations, and Southampton is the chief trading port on the south coast. The Isle of Wight is cut off from the mainland by the channels of **Spithead** on the east and **The Solent** on the west. The former is a great naval harbour, and the latter is the headquarters of European yachting. Fifty

ENGLAND



Fig. 121. England and Wales.

miles west of the Isle of Wight the older rocks which form the points of the coast-line give way to limestone formations. First is a narrow band of harder limestone and then the softer chalk. The latter re-appears in the south of the Isle of Wight and again a few miles further east. It forms the white cliffs of half the coast eastward to Dover. These formations run right across England in a north-easterly direction and are seen again in the limestone cliffs of the Yorkshire and Lincoln coasts. (Sec Geological Outline, Fig. 116).

586. East of the **Isle of Wight** there is little shelter for ships in bad weather till the **Forelands** have been passed and the great estuary of the **Thames** reached, the busiest estuary in the world.

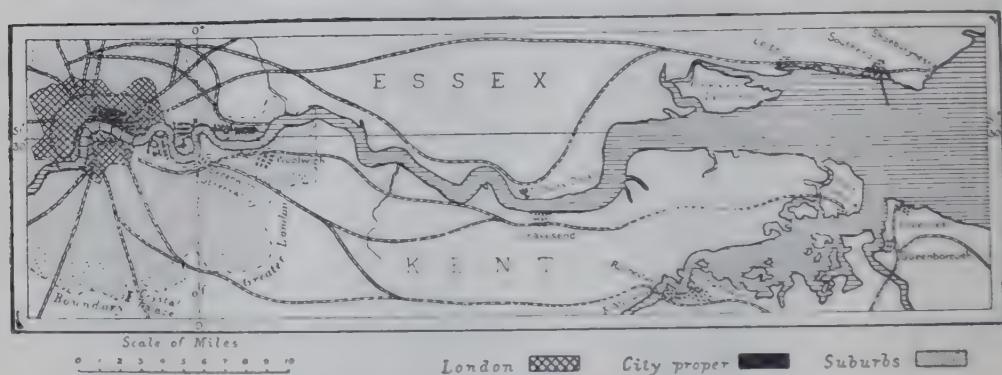


Fig. 122. Estuary of the Thames.

London is about 80 miles from the **North Foreland**, but the port extends for twenty miles down the river to **Tilbury**, vast docks succeeding each other almost all the way.

587. North of the Thames the east coast of England is much less broken than the west. The rounded eastern promontory between the **Thames** and **The Wash** has numerous shallow inlets but no ports of any consequence save **Harwich** and **Yarmouth**. Harwich is important chiefly because of the daily steam services to Antwerp and Rotterdam, and Yarmouth is an ancient town, and the headquarters of a great fishing fleet. The Wash is a broad but shallow inlet between Norfolk and Lincoln. Inland is a region of swamps and marshy land known as **The Fens**. North of the Wash the coast bends westward to the long and deep estuary of the **Humber**, enclosed on the seaward side by a narrow pointed promontory ending in **Spurn Head**. On the Humber is situated the port of **Hull**, which takes on the east coast the position of Liverpool on the

west, and has the greater part of the Baltic trade of England. North of Spurn Head inhospitable limestone cliffs culminating in **Flamborough Head** form most of the coast of Yorkshire to the mouth of the **Tees**, on which river stands the great iron centre of **Middlesbrough**. Further north is the **Tyne**, with **Newcastle** eight miles up the estuary, which, with **North** and **South Shields** at the mouth of the river forms the chief centre of the foreign coal trade. From this point the coast runs north-west with high rocky cliffs fringed with numerous little islands, to the border town of **Berwick-upon-Tweed**.

588. **Surface.** The **Cheviot Hills** form the boundary between England and Scotland. From the Cheviots the **Pennine Chain** runs due south as far as the **Peak** of Derbyshire. It is a broad range mostly of rounded and grassy hills. The highest point is **Crossfell**, in the north, with an elevation of 2,900 feet, and in the west of Yorkshire several parts exceed 2,000 feet. In its central portion the range drops to a height of only a few hundred feet and is crossed several times by railways and even by canals. At each side of the Pennine Chain occur the great coalfields of England which, more than anything else, determine the manufacturing industry of the people. West of the Pennines, in the north, is the group of mountains which form the **Lake District** of England. This group has its centre at **Scawfell**, 3,200 feet in height from which spurs radiate in every direction, enclosing in the intervening valleys the lakes which give the district its name. In the north of Wales there are several groups of grey granite peaks in which the greatest elevations south of the Tweed are found. The highest is **Snowdon** in the north-west, 3,570 feet. Further south **Cader Idris**, **Arran Mawddwy** and **Plynlimmon** and still further south the **Brecknock Beacon**, are over 2,500 feet. The mountains of Wales are irregular. They are not fold-systems, but the surviving heights of a worn-down ancient plateau, intermixed with blocks of volcanic rock. East of the Severn run the **Cotswold Hills**, and west of the river the **Malvern Hills**. Ridges of lower elevation, which are really the exposed edges of successive geological formations, run in three lines north-east and east from a point west of the Bristol Channel. The **Chiltern Hills** stretch in a north-easterly direction north of the valley of the Thames; and south of the Thames the **North Downs**, and near the south coast the **South Downs** stretch eastwards

The North and South Downs are escarpments (or weathered edges) of the chalk formation, and enclose a district known as the **Weald**. The south-east corner of England seems at some age to have been subjected to a north-to-south pressure by which the strata were folded upwards. Along the summit of the ridge thus formed the chalk has been completely worn away by ages of erosion, exposing the Wealden rocks below. (See Fig. 116).



Fig. 123. Great Britain in relief.

589. The **Mendip Hills** run south of Bristol, and in the southern half of Devonshire is the great plateau of **Dartmoor**, from the surface of which massive granite *tors* project, some of them attaining a height of over 2,000 feet. In the north-east of Yorkshire are limestone plateaux of considerable elevation known as the **Wolds** and the **Yorkshire Moors**. The limestone bed which appears on the south coast stretches from Dorset in a bold curve to the mouth of the Tees and almost the whole of the manufacturing industries of England are to be found west of it. Agricultural England lies to the east. The centre of England is a great plain which is hardly broken from the estuary of the Dee to the coast of Suffolk.

590. **Rivers.** As the hills of England are all in the west, almost all the rivers of any size drain eastward to the North Sea. The great exception to this is the **Severn** which rises near Plynlimmon and flows at first north-east, then east, south-east, and south, describing almost three quarters of a circle, and reaching the Bristol Channel between the Cotswolds and the Malvern Hills. Its estuary is shallow, and only boats of little draught can get up as far as the city of Gloucester. The chief rivers of the east are the Thames, the Humber, the Tees, and the Tyne. The **Thames** rises in the Cotswold Hills and flows through a valley of great fertility past London into the North Sea. The numerous rivers which form the **Humber** drain almost the whole of Yorkshire as well as a large part of the counties immediately south, and the **Trent** which joins the Humber estuary flows northward from the "Black Country." The other rivers are all small, and important only for the seaports that stand on their estuaries. The **Wye** which, like the Dee and the Severn, rises near Plynlimmon, flows west and south into the Bristol Channel. It is the most beautiful river in the Kingdom. The **Dee** flows northwards from central Wales past the ancient city of Chester which was at one time a seaport at the head of the estuary. The estuary is now silted up for some miles west of the city. The **Mersey** is a small river but has a large estuary, on which stand Liverpool and Birkenhead. The **Ribble** drains the north-west of Yorkshire and flows into the Irish Sea by the town of Preston, which is situated at the head of its estuary. The **Eden**, rising near the Ribble, flows northward to the Solway Firth. Many of the smaller rivers of England, as well as the larger ones are

navigable by barges for a great part of their length, and are connected by a vast system of canals which put the east and west coasts into communication. The rivers flowing into the English Channel are all very small.

591. Natural Products. Most of the land of England is fairly fertile, the low plains yielding large crops of grain and most of the uplands forming rich pasture land. All the chief **wheat**-growing districts are in the east where the rainfall is least; **oats** and **barley** are grown more in the north and in the midlands. In the mountainous districts of Wales and Yorkshire **sheep** are very numerous, and fairly so in most other parts. **Cattle** are also common everywhere particularly in Cheshire and some of the southern counties.

592. England is, however, a manufacturing country rather than an agricultural one. Since the invention of the steam engine and the application of steam power to the processes of manufacture, England has had an advantage over other nations in her rich and abundant coalfields. Manufacturing towns have grown up on or around these coalfields, where fuel is cheap and plentiful. The development of manufactures has attracted the people from agriculture to a degree that would have been impossible had England not been able to draw largely on other countries for food, and this has been made possible by rapid and cheap steam transit across the ocean. Such transit again depends on cheap and abundant coal. Two-thirds of the food of England is at present imported from foreign countries, and the amount of grain grown in Britain is steadily decreasing. The manufacturing supremacy of England is thus in every way dependent upon her coal, but the decline of agriculture, and the depopulation of the country districts, are the penalties which she has to pay for her commercial greatness.

593. Coal is thus by far the most important of all the mineral products of England. **Iron** comes next. Iron is found in great quantities in close association with coal. The chief iron districts of England are in the north-east on the Durham and Northumberland coalfield, and in central England around Birmingham and Wolverhampton, the district which is known as the "Black Country" from the innumerable blast-furnaces which fill the air with smoke. At one time England was far ahead of all other countries in the production

of iron. Of late years, however, she has been second to the United States. Other important coalfields are in South Wales and Cumberland, and in both these again iron is found in connection with coal. The South Wales coal is the best in the world, being of the hard and smokeless kind known as **anthracite**. The principal manufactures are iron and steel goods of all kinds; cotton fabrics, the manufacture of which centres in a group of towns round Manchester; and woollens which constitute the chief industry of a group of towns in the West Riding of Yorkshire, of which Leeds and Bradford are the chief. Minor manufactures of many kinds, silk, leather, and leather goods, lace, carpets, and others of less moment, are scattered up and down the country.

594. Chief Towns. **LONDON**, the capital of England, and the greatest and richest commercial city in the world, is situated on the Thames at the head of navigation for large sea-going vessels. It is an ancient city, and has always been the principal seaport of the land. About one-third of the shipping of the Kingdom belongs to London. According to the estimate of the Registrar-General for 1908 the population of the "inner ring" of London was 4,684,000, and of the "outer ring," or suburbs, 2,325,000, total 7,009,000. London is ten miles in length, and about seven in breadth. The ancient city had narrow, crooked streets, but the modern streets are spacious and elegant. The principal buildings are the Tower, containing a large collection of arms; Westminster Abbey, where are interred many of the men whose names are prominent in British history; St. Paul's Cathedral, the finest church in Britain; the Houses of Parliament; and Buckingham Palace, the residence of the King. There are underground electric railways and "tubes" in all directions. The river is crossed by several bridges as well as by tunnels underneath the water.

595. Liverpool, near the mouth of the Mersey, in the north-west of England, is the second port of Britain. It is the great cotton port, and has most of the Atlantic trade. The docks extend about 7 miles. One of the first railways in the world ran between Liverpool and Manchester. **Birkenhead**, on the opposite side of the river is a suburb of Liverpool and a thriving port and ship building centre. A few miles further up the river a ship-canal allows sea-going steamers to pass inland to Manchester. **Bristol**, near the mouth of the Lower Avon, was once the capital of the west, and the second seaport in the kingdom. Its accommodation till recently has been

insufficient for large vessels, and much of its trade has gone elsewhere. Of late vast docks have been constructed at Avonmouth. The city has considerable manufactures of glass, soap, sugar, tobacco, and chocolate. **Hull**, on the Humber, has a large Norwegian and Baltic trade. **Newcastle-on-Tyne** and **Sunderland** have



Fig. 124. St. Paul's Cathedral, London.

a great trade in coals. At Newcastle some of the largest ironclads in the world have been built. **Dover** is the seaport nearest France. **Folkestone** and **Newhaven**, west of Dover, also have steam communication with France. **Southampton**, north of the Isle of Wight, is the chief English port for many ocean-going lines of steamers. **Cardiff**, **Swansea**, and **Newport** are seaports in South Wales which draw their importance from the South Wales coalfields.

596. The manufacturing towns are chiefly in the northern half of England, on the coalfields east and west of the Pennines. **Manchester** on the Irwell, with **Oldham**, **Bolton**, **Preston**, **Stockport**, **Blackburn**, and other towns in the neighbourhood, are the great centre of the cotton manufactures. **Birmingham**, near the middle of England with the neighbouring towns of **Wolverhampton**, **Walsall**, **Dudley** and **Wednesbury**, all in the "black country," are the principal seat of the iron industry. **Barrow-in-Furness** on the north-west coast and **Middlesbrough** on the north-east have also large iron works. Barrow has the largest steel works in the kingdom, and a great ship-building trade. **Sheffield**, in south Yorkshire, has also great steel works, and is famed for its cutlery. **Leeds**, also in Yorkshire, with the neighbouring towns of **Bradford**, **Huddersfield**, **Wakefield**, **Halifax** and **Rochdale** are the centre of the woollen manufacture. In the north of Staffordshire is a district known as **The Potteries**. Many clays suitable for making earthenware are found here, though finer kinds are brought from South Devon. In **Burslem**, **Hanley**, **Stoke-on-Trent**, and other towns in the Potteries, the manufacture of earthenware is the chief industry.

597. **Oxford** and **Cambridge** are both famous for their ancient universities. **Canterbury**, in Kent, has a fine cathedral, and the Archbishop is "Primate of all England." **York**, in the north, on the Ouse, is a very ancient walled city, and the seat of an Archbishop. **Windsor**, on the Thames, has been the principal residence of the English Sovereigns from the time of William the Conqueror. **Greenwich**, on the Thames, a suburb of London, is noted for its Observatory, from which longitude is reckoned. **Brighton**, **Hastings**, **Bournemouth** and **Torquay**, on the south coast; **Ilfracombe**, **Llandudno** and **Southport**, on the west; and **Scarborough**, **Margate** and **Ramsgate**, on the east, are the chief sea-side watering-places, but there are many others almost equally popular. **Bath**, **Cheltenham**, **Leamington**, **Harrogate**, **Buxton** and **Tunbridge Wells**, are inland watering places famous for their mineral springs.

SCOTLAND

598. **SCOTLAND**, the northern portion of Great Britain, has an area of about 30,000 square miles, but its population is under $4\frac{1}{2}$ millions. The country is divided naturally into three very distinct parts—a northern, or *highland* part, which consists mainly of an elevated plateau, trodden and worn by countless ages of erosion into a mass of irregular hills and valleys; a southern part of undulating *uplands*; and between the two a comparatively narrow *plain* stretching from sea to sea. The

great bulk of the population, and the chief wealth of the land, are to be found on the plain, which is rich in mineral wealth, especially coal and iron, and has developed great manufactures.

599. Coast Line. From Berwick-on-Tweed, where Scotland and England meet, the rocky coast runs north-westwards to the **Firth of Forth**, near the southern shore of which stands **Edinburgh**, the capital, with its port of **Leith** on the coast. Further up the estuary is spanned by a magnificent railway bridge, one of the finest bridges in the world; and further up still, at the limit of navigation stands the ancient royal town



Fig. 125. The Forth Bridge.

of **Stirling**, built upon a volcanic crag commanding the surrounding plain. North of the Firth of Forth the coast-line runs north-east to **Peterhead**, the only large break in its continuity being the **Firth of Tay**, on the northern bank of which stands the jute-manufacturing town of **Dundee** approached by a railway bridge across the estuary 2 miles long. Fifty miles further north along the coast is the beautiful granite city of **Aberdeen** at the mouth of the **Dee**. At **Peterhead** a harbour of refuge is in process of construction. The coast is a dangerous one and there are few shelters for shipping under stress of

weather. North of Peterhead the coast turns west, and for more than 60 miles has no considerable opening save the mouth of the river **Spey**, the finest salmon river in the country. At the head of the **Moray Firth** stands the beautiful town of **Inverness**, the capital of the Highlands. Inverness is situated at the end of a great rift which runs across the island from north-east to south-west and cuts off the whole of the northern and north-western parts of the Highlands from the rest. This rift is known as **Glenmore**, the **Great Glen**. Several narrow and deep lochs occupy the depression, and these, connected by the Caledonian Canal, form a waterway of great beauty from the eastern to the western seas. From Inverness the coast again runs north past the port of **Wick** up to the extreme north-eastern point of the island where high red-sandstone cliffs look across the stormy **Pentland Firth** to the **Orkney Islands**, also of old red-sandstone. Before the western corner of the northern peninsula is reached, the ancient crystalline rocks which characterize the greater part of the Western Highlands begin. Of similar rocks are the **Shetland Isles**, north of the Orkneys. The Scandinavian highlands—the Shetlands, the Western Highlands of Scotland, and the north-west of Ireland, are all parts of the crystalline buttresses of the ancient land-mass of Europe, though the archæan rock is now found in conjunction with many later formations, particularly the old red sandstone. Countless ages of erosion have worn the rocks down and carved them into a thousand shapes, cutting deep valleys to the sea, and the whole has then been deeply submerged towards the west, making the western coast a succession of flooded valleys fringed by a vast number of rocky islands.

600. The principal islands are the **Outer Hebrides**, consisting of the large island of **Lewis** and a number of smaller ones to the south, and the **Inner Hebrides**, further south and nearer the mainland. The southern islands are separated from the north of Ireland by the **North Channel**, which connects the Irish Sea with the Atlantic Ocean. From the North Channel the **Firth of Clyde** runs northward till it meets the estuary of the river, which has been artificially deepened so as to admit large vessels. On the **Clyde** is the great city of **Glasgow**, next to London the largest commercial city in Britain, and around it near the central coalfields cluster a number of important manufacturing towns. South of the Clyde estuary the eastern

shores of the Firth continue low till the gentle slopes of the western uplands are reached which stretch south-westwards in a broad peninsula between the **Firths of Clyde and Solway**. The extremity of this peninsula is almost insular, and reaches to within 22 miles of the Irish coast. The southern point is the **Mull of Galloway**.



Fig. 126. Scotland.

601. General Features and Drainage. The **Highland** region proper is bounded on the south by hills running almost in a straight line from a point on the west coast a few miles north of the Clyde to another on the east a little to the south of

Aberdeen. This line really represents an ancient rift (or geological *fault*) which marks the broad depression of the central plain. It is formed by a long irregular line of heights which stand out prominently and are known as the **Grampian Mountains**. To the north of it is the large ancient plateau, worn irregularly into innumerable narrow and beautiful valleys often containing deep *lochs*. The highest peaks are **Ben Nevis** (4,400 ft.) east of the Caledonian Canal, and **Ben Macdhui** (4,300) half way between Ben Nevis and Aberdeen. Many other peaks are over 3,000 feet. The Highlands as a whole are the delight of tourists for their rugged beauty, but economically their products are few, and apart from the coastal towns the population is very sparse. There is a narrow strip of cultivated land along the eastern coast, but elsewhere there is little cultivation of any kind. The fisheries along the north coast are valuable. The drainage of the Highlands is chiefly to the east. The **Tay**, with its numerous tributaries, and the **Forth** drain the central and southern slopes of the Grampians. The **Dee** and the **Don** enter the sea at Aberdeen, and the **Spey** flows northward to the Moray Firth.

602. The **Southern Uplands** form one of the richest agricultural districts in Britain, where scientific farming is carried on with great success. *Oats* and *barley* are grown in the valleys, and large herds of cattle and flocks of sheep find pasturage on the hill sides. The rivers all rise in the central hills, the **Tweed** flowing east to Berwick, the **Nith** and the **Annan** south to the Solway, the **Clyde** northwards past Glasgow, and the **Doon** westwards through Ayr.

603. The **Central Plain** is watered by rivers which flow southwards from the rugged Highlands, and north from the agricultural Uplands. The plain is exceedingly fertile and yields heavy crops of grain and roots. But its great wealth is in the manufactures which have gathered round its coal beds. There are three chief coalfields, an eastern one in Fife, between the Firths of Forth and Tay, a western one in Ayr, and a much larger central one east of the Clyde. The chief manufactures are *iron*, *cotton*, *linen* and *woollen* goods. The greatest *ship-building* yards in the world are on the Clyde.

604. **Chief Towns.** EDINBURGH (316,000), the capital, near the Firth of Forth, is one of the most beautiful and picturesque cities in Europe. Edinburgh Castle stands on a

precipitous rock in the centre. The city took its name from Edwin, a Northumbrian prince who held it in the seventh century. It became the capital of Scotland in 1437. It contains Holyrood, the palace of the ancient Kings, and is the seat of a celebrated university.

605. Glasgow (736,000) on the Clyde, is the largest city in Scotland, and a centre of manufactures and commerce. It is celebrated for its ship-building and engineering works. Glasgow is the centre of a great iron and coal district, and is the second city in the kingdom.

606. Paisley, seven miles west of Glasgow, is as noted now for its thread as it formerly was for its shawls. **Greenock** is a large seaport at the mouth of the Clyde. **Stirling**, on the Forth, has a celebrated Castle, and was the favourite residence of the Scottish Kings. **Perth**, on the Tay, was at one time the capital of Scotland. **St. Andrews**, east of Perth, has the oldest university in Scotland. **Leith**, on the Firth of Forth, is the port of Edinburgh, of which it is practically a suburb. **Dundee** (160,000) on the Firth of Tay, is the third city in Scotland, and the chief seat of the linen and jute manufactures. **Aberdeen** (143,000) on the east coast, is a place of considerable trade, and the seat of a university. It is noted for its beautiful granite. **Inverness** is the chief city in the northern highlands. **Peterhead**, the most easterly town of Scotland, is noted for its whale fisheries. **Balmoral**, the Scotch residence of the King is west of Aberdeen. **Wick**, in the north-east, is the chief seat of the herring fishery.

IRELAND

607. IRELAND is separated from England by **St. George's Channel** and the Irish Sea, and from Scotland by the **North Channel**. In size it is the third island of Europe, having a total area of 32,500 square miles. In 1841 the population was over 8 millions, but it is now only $6\frac{3}{4}$ millions. The decline is partly due to a great potato famine in 1846, and partly to emigration to America. Previous to 1846 the potato was the main food of the peasantry, and the complete failure of the crop in that year resulted in widespread suffering and mortality. Since then other crops have been more largely grown, but the potato is still the staple food of a large section of the people.

608. General Features. The north-western part of Ireland and the square promontory of Connaught consist largely of ancient crystalline rock which, like the corresponding coast of

Scotland, has been deeply eroded and partially submerged. All around the coast, at a little distance from the sea, the hills rise to heights of from 1,500 to 2,500 feet. The south-western promontory is chiefly sandstone and limestone, and the softer limestone has worn away leaving long deep indentations



Fig. 127. Ireland.

running far into the land. Here, in the group of hills known as Macgillicuddy's Reeks, is found the highest point in the island, Carn-tual, which rises to a height of 3,400 feet. In the south there are a few detached ranges of hills of no great height. Along the east, in a line between Waterford and Dublin, stretch the hills of Wexford and Wicklow with numerous peaks

above 2,000 feet, and two over 3,000. The north-east corner of the island is a plateau of moderate height composed entirely of hard volcanic rock, with **Lough Neagh**, the largest lake in the British Isles, in a depression in the centre. On the north coast, at the edge of this volcanic region, is the **Giant's Causeway**, one of the most remarkable specimens of columnar basaltic rocks in the world. The higher levels of Ireland thus extend round the greater part of the coast, and form a ring within which lies the broad **central plain**, sloping generally south and east.

609. Rivers, etc. The **Shannon** is the longest river in the British Isles. It rises in the north-west, runs southwards through the heart of the plain, and turning west near Limerick falls into the Atlantic. The **Liffey**, a short river, enters the Irish Sea near Dublin. The **Boyne** discharges into the same sea a little further north. The **Barrow**, with its tributary the **Suir**, flows southwards to St. George's Channel. Ireland has many lakes, **Killarney** and some others being of great beauty. These with the rivers and numerous canals (one of which, the **Grand Canal**, connects the Shannon with Dublin), form important lines of communication. Railways also radiate from Dublin in all directions.

610. Climate and Products. The climate is mild and moist. The west wind from the ocean, laden with moisture, first breaks upon Ireland. The entire country is so constantly green with verdure that it has been called "**The Emerald Isle.**" About one-seventh of the plain consists of bogs. Ireland is chiefly a grazing country, but *oats*, *potatoes*, and *barley* are largely grown in most parts. *Flax* is grown extensively in the north-east. The salmon fisheries in the rivers are valuable.

611. The only important manufacture is that of *linen*, which is carried on in the north-east mainly by the descendants of Scottish settlers who were introduced into Ulster by James I. They form the most vigorous and progressive section of the population. Ireland has little coal, and that used in the linen mills of Belfast comes chiefly from the Scotch coalfields. Cattle, butter, and linen are the chief exports. The trade of the island is mainly with Britain.

612. Chief Towns. In the east, DUBLIN (362,000) the capital, on the Liffey, is a large and beautiful city and the residence of the

Lord-Lieutenant, or Viceroy. It is the seat of a university known as Trinity College. **Belfast** (256,000) in the north-east, at the head of Belfast Lough, is the second city in the island, and the first in trade, manufactures, and ship-building. **Cork** (75,000) in the south, the third city, has a noble harbour and a large export trade in provisions. **Limerick**, on the Shannon, is the principal seaport in the west and has manufactures of lace. **Queenstown**, on an island in Cork harbour, is a port of call for American mail steamers. **Londonderry**, on the Foyle, is memorable for the siege it sustained in 1689 against the forces of James II.

DENMARK

613. **DENMARK** includes the peninsula of **Jutland** stretching northward between the southern points of Norway and Sweden from which it is separated by the **Skager Rack** and the **Kattegat**, together with numerous islands in the Baltic of which **Zealand**, **Funen**, **Laaland**, **Falster** and **Bornholm** are the largest. The islands Zealand and Funen block up the entrance to the Baltic, except for three narrow channels, **The Sound** in the east, **The Great Belt** in the centre, and **The Little Belt** in the west. The Great Belt is the largest channel, but the Sound is the most frequented by shipping. The total area is about 14,800 square miles, and the population $2\frac{1}{2}$ millions

614. **Surface.** Denmark is a portion of the great European plain. In no part does the elevation exceed 600 feet. The peninsula is much indented by shallow, winding inlets, called *fjords*. The **Liim Fjord** extends right across its northern part. Marshes and lakes are numerous and in some parts the sea is kept out by dykes as in Holland. The west coast has only shallow inlets made dangerous to shipping by low sandbanks that lie across their entrances. The east coast along the **Kattegat**, on the other hand, has some good harbours. Like the mainland the islands are low and sandy with the single exception of **Bornholm**, which is rocky and has steep coasts but no good harbour.

615. **Climate, Products, etc.** The climate is damp and cloudy, particularly in Jutland where north-west winds and cold fogs are very common. The southern islands are milder and have much more sunshine. *Barley*, *rye* and *oats* are the principal grains. Cattle are reared extensively, and *butter*

and *cheese* are made in large quantities. The *fisheries* along the coasts are also valuable. Denmark has no mineral resources save a little coal in Bornholm. The chief **imports** are coal, iron, cotton goods, and sugar; the chief **exports** are butter, cattle, corn, eggs, and hides. The inhabitants of Jutland and the Islands are all **Teutonic** and resemble the Norwegians and Swedes. They are thrifty, industrious, and enterprising. Education is free and compulsory. The established religion is Protestant Christianity of the Lutheran form.

616. Towns. COPENHAGEN (476,000), the capital, is a fine city in the east of Zealand, with a celebrated university. Many of the streets are intersected by canals. **Elsinore**, in Zealand, is a port at the narrowest part of the Sound. Here at one time ships passing through the Sound were compelled to pay toll. The most important town in Jutland is **Aarhuus** on the Great Belt. It is connected by rail with **Aalborg**, on the Liim Fjord, and **Frederikshavn** in the north, and with **Fredericia** and **Esbjerg** in the south, all of them seaports of some local importance.

617. The foreign possessions of Denmark consist of the **Farøe Islands**, **Iceland**, some scattered settlements in **Greenland**, and three small islands in the West Indies, **St. Croix**, **St. Thomas**, and **St. John**.

618. The **Farøe Islands**, about half way between Shetland and Iceland, are of volcanic origin. They are about 22 in number, of which 17 are inhabited. The largest is **Stromö** on which is **Thors-havn**, the one town on the islands. The **Farøese** live by sheep-farming, fishing, and collecting the down of the eider-duck, which they export.

619. **Iceland**, the second largest island of Europe, lies in the North Atlantic Ocean about 600 miles north-west of the Orkneys. Its most northerly point extends to the Arctic Circle. It consists of dark volcanic rock, and has many active volcanoes, of which the largest is **Hekla**, and numerous *geysers*, some of which throw their boiling water to a height of 200 feet. (See Fig. 38.) None of the mountains rise to over 6,300 feet, but as the snow-line in that latitude is low there are many small glaciers. The south coast is not much above sea-level and has no harbours, but the other coasts are much indented by fjords, and in the west and north of the island there are some large bays.

620. The climate of Iceland is less arctic than its position would lead one to expect. The north coast facing the Arctic Ocean is cold, but along the south and south-west coasts the summers are pleasant, and the winters mild. No grain can be grown, but there is good pasture, and both sheep and cattle are reared, as well as horses.

Sea-birds breed in large numbers on the coasts, especially the eider-duck the down of which is exported in large quantities. The Icelanders belong to the Scandinavian race. They are well educated and speak the old Norse language. **Reykjavik**, the capital, is on the west coast.

NORWAY

621. NORWAY occupies the western part of the **Scandinavian Peninsula**, and is one of the most mountainous countries in Europe. A long chain of ancient crystalline mountains extends from the **Naze**, the most southerly point, to the extreme north. They form the coast-line and have been worn by countless ages of erosion into deep valleys and fjords. Innumerable rocky islands fringe the coast. The southern part of the range is called the **Hardanger Fjeld**; the central, the **Dovre Fjeld**. In the north the **Kiolen Mountains** form the boundary between Norway and Sweden. **Galdhoppig**, the highest peak, is 8,546 feet above the sea. The summits of the range are covered with perpetual snow. **North Cape**, on the island of **Mageröe**, is about 1,290 feet. The **Lofoden Islands** are a numerous group off the north-west coast. Between two of them is the *Maelstrom*, a remarkable whirlpool formed by the meeting of opposite currents. The Norwegian rivers are mostly wild torrents, whose courses are broken by rocks and cataracts.

622. Climate. The summer is short and warm; the winter is long but, owing to the Gulf Stream Drift which washes the coast, not so severe as in the eastern portion of the peninsula. A great part of the north of the country lies within the Arctic Circle. There are fertile tracts in the south, but the soil is generally poor. *Barley*, *oats*, and *rye* are cultivated in the warmer districts; but grazing is of more importance than agriculture. About one-fifth of the land is covered with *forests*, chiefly of pine. Moss, the food of the reindeer, is plentiful in the north. The *fisheries* are very valuable. In the early part of the year about 20 000 fishermen assemble at the Lofoden Islands. Timber, fish, wood-pulp for paper making, and ice are the chief **exports**; clothing, food, and coals, are the chief **imports**.

623. People. Norway is the most thinly peopled country in Europe. The population is not quite 2½ millions, being only

18 to the square mile. Most of the people belong to the same branch of the **Teutonic** race as those of Denmark and Sweden. At one time the entire Scandinavian Peninsula was part of the Kingdom of Denmark, which was then the most powerful kingdom of northern Europe. From 1814 to 1905 Norway and Sweden, though maintaining separate Legislatures, were united under one King, who ruled over the whole of the Scandinavian Peninsula. In June 1905, the Norwegians repudiated the union, and the two nations are now separate Kingdoms.

624. Towns. **CHRISTIANIA** (227,000), at the end of a fjord in the south-east, is the capital and the seat of a university. The town is named after Christian IV., who founded it. **Bergen** and **Trondhjem** are seaports in the west. Bergen has a large export of dried fish. Trondhjem was the ancient capital, and is the northern limit of wheat culture.

SWEDEN

625. SWEDEN, nearly half as large again as Norway, includes the eastern part of the **Scandinavian Peninsula**, together with the islands **Gothland** and **Öland** in the Baltic. The area is about 173,000 square miles. The eastern coastal strip is low and flat, and the interior rises by terraces towards Norway in the west. The southern part belongs to the great European Plain. The rivers are numerous, but much broken by cataracts. The **Gotha**, the largest river, enters the Kattegat. The **Tornea** flows into the Gulf of Bothnia, and divides the north of Sweden from Russia. **Lake Wener**, the third lake for size in Europe, and **Lake Wetter**, are in the south. There are numerous smaller lakes. The **Gotha Canal** joins the Baltic and the Kattegat by means of lakes Wener and Wetter.

626. Climate and products. The climate resembles that of Norway, but the rainfall is less, and the cold in winter is more severe. The *iron-mines* of Sweden are the most famous in the world, and there are large *pine* forests. *Wheat* is grown to some extent in the south, but *barley* and *oats* are the chief grains and form the staple food of the people. Timber, cattle and iron are the principal **exports**, and the **imports** are mainly clothing, food and coals.

627. The population is over 5 millions in number, or 30 to the square mile. Next to Norway, Sweden is the most thinly peopled country in Europe. The Swedes are industrious and well educated. Like the Norwegians and Danes, they belong to the **Scandinavian** race, and in religion are Protestants. They are tall and fair-haired, with blue eyes. There are a few **Finns** and **Lapps** in the north.

628. Towns. **STOCKHOLM** (247,000), the capital, is a beautiful city situated at the junction of Lake Maelar with an inlet of the Baltic. It stands partly upon small rocky islands, and from its position has been called the "Venice of the North." It has considerable manufactures, and is the chief seaport. **Gothenburg**, in the south-west, on the Gotha, is the second commercial city. **Upsala**, north-west from Stockholm, was the ancient capital, and has a famous university. To the north is **Danemora**, containing the richest iron mines in Sweden.

629. **LAPLAND** is situated to the north of the Gulf of Bothnia. Part of it belongs to Norway, part to Sweden, and part to Russia. It is a cold, desolate region, covered with snow for most of the year. The inhabitants are **Mongolians**, and are a small yellow, beardless, people. They lead a wandering life with their herds of reindeer, which afford them both food and clothing.

THE NETHERLANDS, OR HOLLAND

630. The **KINGDOM OF THE NETHERLANDS** is bounded on the north and west by the North Sea, on the east by Germany, and on the south by Belgium. Its area is 12,648 square miles, and its population $5\frac{1}{2}$ millions. Till 1815 the Kingdom was called **HOLLAND**, after the name of its chief province. The word *Holland* means *hollow land*, and as a name it is eminently descriptive, for the Netherlands, or **Low Countries**, form the lowest and flattest State in Europe. Large tracts are as much as 30 feet below the level of the sea, which is kept out by artificial dykes, or embankments. As the safety of the country depends on these embankments they are protected with the utmost possible care, and are faced and strengthened with granite blocks. The low-lying provinces are divided into sections, called *polders*, by embanked and elevated canals which drain into the rivers, and innumerable windmills are continually at work pumping the water from the polders.

631. Rivers, etc. The country is traversed by the lower courses of the **Rhine**, the **Meuse**, and the **Scheldt**. It includes the delta of the Rhine, the largest delta in Europe, of which the **Waal** is the principal channel. The rivers, with the network of canals, form the chief commercial highways, taking the place of roads in other countries. Several inland bays have been formed by the bursting in of the sea. The **Zuyder Zee** (the *South Sea*, in contradistinction to the *North Sea*, with which it is connected), was formed by successive inundations in the



Fig. 129. A part of the Dutch coast showing Sand Dunes and Dykes.

thirteenth century. In 1568 a large lake was formed, when 72 villages were submerged and 100,000 inhabitants drowned. There are many sandy islands in the shallow waters, the principal of which are **Walcheren** and **Beveland**, in the south, and **Texel** towards the north.

632. Climate and Products. The climate is damp and cold. The rivers and canals are frozen in winter, and travelling is then often performed on the ice by means of sledges and skates. The land is too wet and cold for the cultivation of grain, but the polders form rich pasture-land, on which great numbers of excellent cattle are reared. Dairy-farming, including the production of cheese and butter, is the chief agricultural occupa-

tion. Large quantities of vegetables are also grown. The marshes breed frogs and boring worms, which are not only injurious to agriculture, but also damage the embankments. On this account the stork, which feeds on these pests, is protected by law.

633. Commerce. Holland had at one time the most extensive commerce in Europe. In 1904 its foreign trade had a total value of £366,000,000, an enormous value for so small a country. Holland has extremely productive colonies, and her ports are the chief centres from which coffee, spices and tobacco are distributed through northern and central Europe. The principal **exports** are butter, vegetables, sugar, paper, and cattle. The chief **imports** are cotton and woollen goods, iron, cereals and flour, coffee, spices and tobacco. The country is well supplied with railways.

634. People. The Dutch are **Teutons** by race, and are born traders and sailors, remarkable for their cleanliness, frugality, and industry. They are stolid and patriotic, and distinguished for the courage with which they have maintained their freedom. About two-thirds are Protestants, and the remainder Roman Catholics. Holland and Belgium formed part of the Empire of Philip II. of Spain. When he fiercely persecuted the Protestants, those in Holland revolted, and after a long and bloody war their independence was admitted in A.D. 1609.

635. Towns. **AMSTERDAM** (551,000) the capital, at the mouth of the Amstel on the Zuyder Zee, was once the foremost commercial city in Europe, and still possesses extensive trade. It is noted for diamond-cutting. It is built on piles driven into the ground, and many of the streets have canals in the centre. The Great Canal connects it with the North Sea. **The Hague** (234,000), near the coast, is a handsome town and the seat of the Court. A Peace Conference has twice met here, and an International Arbitration Court has recently been set up. **Rotterdam** (370,000), on the Maas, is the chief commercial city and seaport of the Kingdom. It has eclipsed Amsterdam and now has nearly three-fourths of the foreign trade. **Flushing** is a small port which, like Rotterdam, has a daily steamer service to England.

636. Foreign Possessions. The principal Dutch colonies are the Island of Java, the Moluccas, parts of Sumatra, Borneo, Celebes, and New Guinea, Dutch Guiana or Surinam, in South America, and five small islands in the W. Indies. Their area is about 783,000 square miles, with 35 million inhabitants.

BELGIUM

637. The KINGDOM OF BELGIUM lies to the south of Holland and north-east of France. The area is about 11,400 square miles and the population nearly 7 millions. The surface is flat except in the south, where the plateau of the **Ardennes** rises to



Fig. 130.

a height of 2,000 feet. The encroachments of the sea on the coast are prevented by wind-blown sand-dunes. The principal rivers are the **Meuse** in the south-east which, like its tributary the **Sambre**, flows northwards through a deep, winding valley, and enters the southern point of Holland, and the **Scheldt** which flows through the western lowlands and enters Holland near the sea. Canals are numerous.

638. Climate and products. The climate resembles that of England, but the summer is hotter and the winter colder. The south and east contain extensive forests, but a large part of the country is highly cultivated. *Grain, tobacco, and flax* are raised in large quantities. Along the valley of the Sambre, at the base of the highlands, are exceedingly valuable *coal-fields*. *Iron* of excellent quality also occurs. Both these minerals are largely worked and from Mons to Namur and Liège is a stretch of "black country" where coal pits and blast furnaces abound.

639. People. The **Walloons** (foreigners) in the south-east are of **Celtic** origin; the rest of the population, called **Flemings**, are of German descent. Next to Saxony, Belgium is the most densely peopled country in Europe. There are 589 inhabitants to the square mile. French and Flemish are spoken. Almost nine-tenths of the people are Roman Catholics.

640. Industries and Commerce. As in England the presence of coal has led to the development of many manufactures requiring steam power, amongst which are *linen, cotton, and woollen fabrics*. The *iron and steel* manufactures are specially valuable. Belgium is also noted for its *lace*, which is an ancient hand-industry. Trade is greatly facilitated by good roads and a close network of railways. The chief **imports** are grain, flax, wool, cotton, and hides, and the chief **exports** yarns, linen, coal, and machinery.

641. Towns. **BRUSSELS** (600,000) the capital, on a tributary of the Scheldt, is a well-built city, noted for its lace and carpets. The famous battlefield of **Waterloo** is nine miles from Brussels. **Antwerp** (300,000) on the Scheldt, with a strong fortress, is the chief commercial city in Belgium. In the sixteenth century it was the richest city in Europe. The cathedral has a very lofty spire, and contains some exquisite paintings. **Mechlin, or Malines**, between Antwerp and Brussels, is noted for its lace. **Ghent**, on the Scheldt, is the chief seat of the cotton manufactures, and has the principal university in the Kingdom. **Liège**, on the Meuse, is noted for its iron

manufactures. **Ostend**, on the coast of the North Sea, is the second seaport, and a fashionable watering-place.

642. **LUXEMBURG** is a Grand Duchy wedged in between Germany, France, and Belgium, with an area of nearly 1,000 square miles. It is included in the German *Zollverein*, and once belonged to the German Confederation, but is now independent. It has important mining and iron industries. The chief town is **Luxemburg** (21,000), and the total population of the Duchy is nearly a quarter of a million.

FRANCE

643. **FRANCE** is bounded on the north by the English Channel and Belgium; on the east by Germany, Switzerland, and Italy; on the south by the Mediterranean and Spain; and on the west by the Atlantic Ocean. The area is about 207,000 square miles, and the population 38½ millions. France has a long coast line, more than half its total frontier being to the open sea. The coast is varied in character, and has numerous good natural harbours.

644. **Surface.** On the south-east the frontier of France reaches the higher **Alps** and is continued northwards along the crest of the **Jura Mountains** and the **Vosges**. On the west the surface drops gradually to the narrow **Valley of the Rhone** in the south, and to the **Plain of Burgundy** in the north, through which the **Saône** flows southwards to the Rhone. The Rhone valley is flanked on the west by the **Cevennes Mountains** from which the high plateau of **Auvergne** stretches into the heart of France. This plateau is mainly volcanic, and contains extinct volcanic peaks, some of which rise to a height of 6,000 feet. West of Burgundy is the lower and narrower **Plateau of Langres** which is united with the Vosges in the north. North and west of this plateau is a vast plain, stretching to the sea, and broken by few elevations of over 1000 feet.

645. **Rivers.** There are four principal river basins. The **Seine** with its tributaries drains the Plateau of Langres and takes a winding north-west course to the English Channel. Paris, the capital, Rouen, a great manufacturing town, and Hayre, the second French seaport, are all on the Seine. The river and its tributaries are navigable for more than 450 miles and one of the latter, the **Yonne**, is connected with the **Saône**

FRANCE

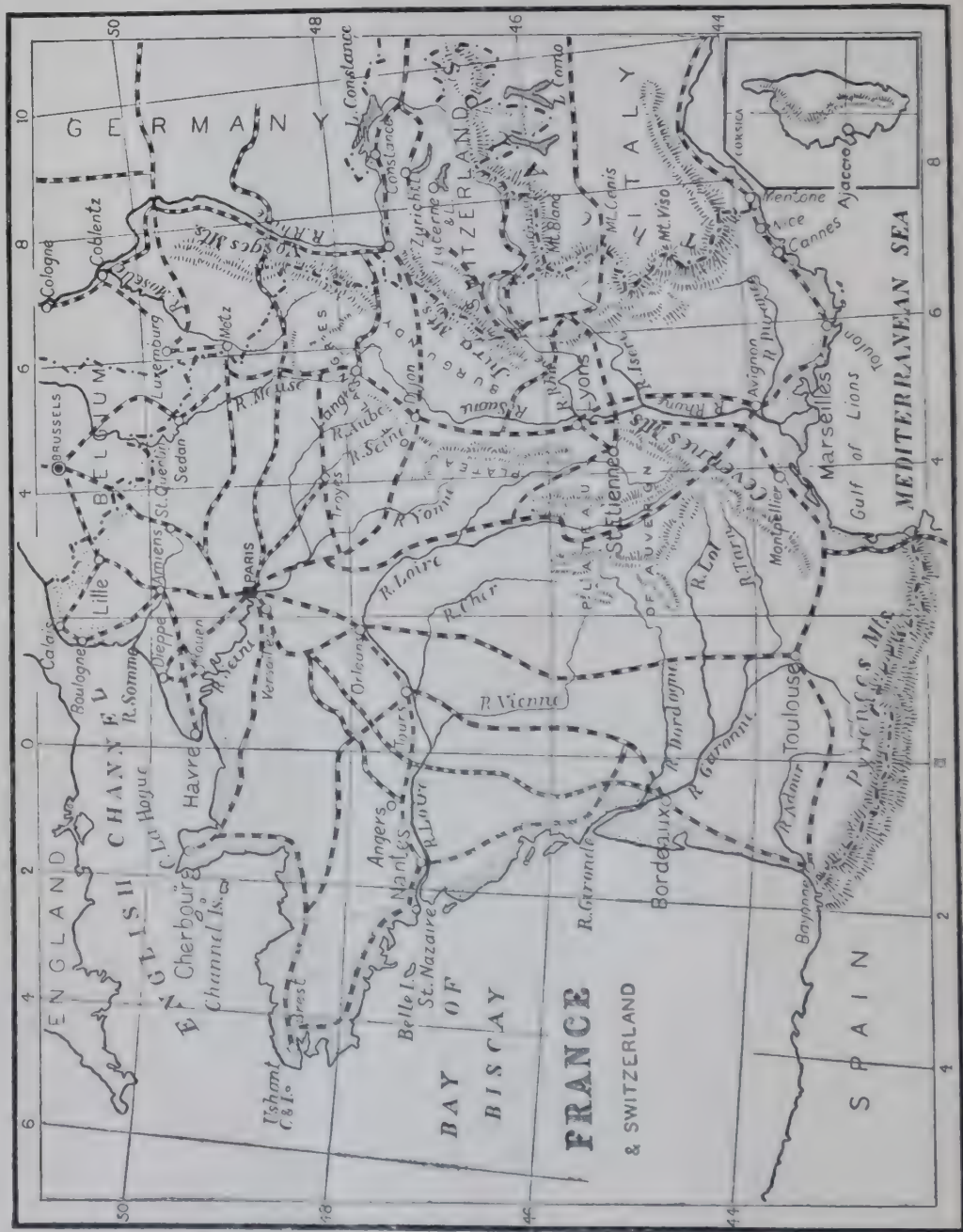


Fig. 131.

by canal. The **Loire** is the greatest river of France, and with its numerous tributaries drains the greater part of the central highlands. On its banks are the important towns of Orleans, Tours and Angers. Nantes at the head of its estuary, and St. Nazaire at its mouth, are both busy ports. The Loire is navigable for 500 miles, and has canal connection with both the Seine and Rhone. The **Garonne**, flowing north-west from the slopes of the Pyrenees, and the **Dordogne** from the Auvergne Plateau, unite to form the great estuary of the **Gironde** at the head of which is the flourishing port of Bordeaux. The **Rhone** from the Swiss Alps, with the Saône from the Vosges, flows south to the Mediterranean. At the junction of the two rivers stands the great city of Lyons. The Rhone is a swifter stream than the rivers of the west, and its navigation is therefore not so easy. Canals unite it with the Rhine, the Seine and the Loire. There are a large number of other canals in France, almost all the chief areas of production being thus united. Including the rivers the country has over 12,000 miles of navigable water-ways.

646. Climate and Natural Products. The climate varies much in different parts. Brittany is influenced by the Gulf Stream, and has abundant rain with no great extremes of heat or cold. Further east the winters are colder and the summers hotter. The south has long, hot, and dry summers. The soil is generally fertile. *Wheat* and *beetroot*, from which sugar is made, are very largely grown in the north. The *vine* is extensively cultivated in the centre and south. *Rye* and *oats* are grown in the colder regions, the former especially on the high plains. *Maize*, the *olive*, the *orange*, and *mulberry* trees (for silk worms, which are largely reared) are characteristic of the Mediterranean districts. Forests cover about one-eighth of the country, and are carefully preserved. France has no great mineral wealth, but considerable quantities of *iron* and *coal* are obtained, chiefly in the north-east where the coal beds stretch south-west from Belgium.

647. People. The French belong mainly to the **Celtic** family. A few near the Rhine are of **Teutonic** descent, others in the south-west are of **Spanish** origin. The country was early peopled by the Celts or **Gauls**. It was conquered by the Romans about 50 B.C. and afterwards, about 450 A.D. by the Franks, a German tribe. The **French** language is well known

throughout Europe, and is the language of international diplomacy. **Agriculture** is the chief occupation of the people. As the property of a father is shared equally by his children at his death, the land is divided into a large number of **small holdings**. Most of the peasants *own* their land, and as they naturally seek to make the most of it many parts of France are among the best tilled lands of Europe. The majority of the people are Roman Catholics. The government, which has passed through many changes, is at present **Republican**.

648. Manufactures and Commerce. France ranks next to England and Germany as a manufacturing country. The *silk* and *woollen* manufactures are the most important; *wines* and *cotton* rank next. France is one of the chief wine producing countries of the world. The foreign trade of France amounts to over £400,000,000 a year. The chief **exports** are silks, woollens, cottons, wine, linen, leather, and brandy; the chief **imports** are raw wool and cotton, silk, oil-seeds, coal, timber, and hides. The trade of the country is well served by railways which branch out from Paris in all directions. The French and Italian railways are united by a long tunnel under the **Mont Cenis** pass.

649. Chief Towns. **PARIS** (2,714,000) the capital, situated on the Seine, is the third largest city in the world, and is strongly fortified. It is celebrated for its superb public buildings, and is the seat of a famous university and of numerous scientific institutions.

650. Lyons (459,000), on the Rhone at its junction with the Saône, is the third city in France, and the chief seat of the silk manufacture. **St. Etienne**, south-west of Lyons, is noted for its iron manufactures and ribbons. **Rouen**, on the Seine, is the centre of the French cotton trade. **Lille**, in the north, has manufactures of linen and cotton. **Marseilles** (491,000), on the Mediterranean, is a very ancient city founded by the Greeks from Asia Minor about 600 B.C. It is now the greatest seaport in France. **Bordeaux** (257,000), on the Garonne, is the chief port for the wine, oil and fruit trades. **Havre**, at the mouth of the Seine, is the second seaport of France; **Calais** on the Straits of Dover, and **Boulogne** and **Dieppe** on the English Channel, are the chief ports for communication with England. **Toulon** on the Mediterranean, **Brest** on the Atlantic, and **Cherbourg** on the English Channel, are the principal naval stations.

651. Corsica is an island in the Mediterranean, north of Sardinia. The soil is stony and little cultivated. The timber trees and fruits

are valuable, but cattle constitute the chief wealth of the people. The language spoken is a dialect of Italian. **Ajaccio**, the capital, on the western coast, was the birthplace of Napoleon Bonaparte.

652. Foreign Possessions. The principal colonies of France are **Algeria**, in Northern Africa ; **Senegal**, **Niger**, and the **Congo Territory**, in Western Africa ; **Cayenne** in South America ; **Madagascar** and **Bourbon**, islands in the Indian Ocean ; **Pondicherry**, etc., in India ; **Tonquin** and **French Cochinchina** in the Indo-Chinese Peninsula ; **New Caledonia**, etc., in the Pacific Ocean ; and some small islands in the West Indies. **Tunis** and **Annam** are protectorates. The total area is slightly under 4 million square miles.

653. **MONACO**, near Nice, is a very small independent Principality, notorious for its gambling establishment at **Monte Carlo**. It has now a better title to fame as the seat of the only **Museum of Oceanography** in the world, which has recently been built and equipped at great expense by the Prince.

SWITZERLAND

654. **SWITZERLAND** is an inland country, oval in shape, bounded on the north by Germany, on the east by Austria, on the south by Italy, and on the west by France. The area is almost 16,000 square miles, and the population is a little over 3½ millions. Switzerland is the highest and most mountainous country in Europe and is celebrated for its scenery. It is traversed by ranges of mountains rising from a tableland. The **Jura Mountains** divide Switzerland from France, the **Alps** separate it from Italy on the south and France on the west. **Mont Blanc** on the French frontier, and **Monte Rosa** on the Italian are the highest mountains in Europe save Mount Elbruz in the Caucasus. The **Bernese Alps**, or **Oberland**, is a lofty range, parallel to the Southern Alps, from which it is separated by the upper course of the Rhone. The **Finsteraarhorn** (14,026 feet) is the highest point. Switzerland is a country of contrasts. Lofty peaks covered with perpetual snow, and having immense glaciers stretching down their sides, alternate with wooded slopes, deep blue lakes, vine clad fields, and bright patches of vegetation. Sometimes huge masses of snow, called *avalanches*, descend from the mountains burying whole villages. The Alps are crossed by several passes. (See § 558.) Tunnels beneath the St. Gotthard and

the Simplon Passes now join the Swiss and Italian Railways. They are the longest tunnels in the world.

655. Rivers and Lakes. The **Rhine** flows northwards through the Lake of Constance; the **Rhone** flows westward through the Lake of Geneva. The **Aar** is a tributary of the Rhine: the **Inn** flows eastward into the Danube. Switzerland slopes in all directions from Mont St. Gotthard, on the higher slopes of which are the sources of the Rhine and the Rhone. The waters of **Lake Geneva** are very deep, and beautifully transparent. **Neuchâtel**, **Lucerne**, and **Zurich**, are other lakes famed for their romantic scenery.

656. Climate and Productions The valleys are warm like those of southern France. The rainfall is everywhere abundant. The *vine* is cultivated in the valleys, where also some *grain* is raised; but Switzerland is mainly a pastoral country. The *chamois*, a kind of deer, is often hunted. *Watches* and *jewellery* are made in the west; *cotton*, *woollen*, and *silk* manufactures are carried on in the north. The **exports** are silk and cotton manufactures, watches, cheese, and preserved milk; the **imports** are grain, raw cotton and silk, coal, tobacco, sugar, and coffee.

657. People. The Swiss are noted for bravery, and for their love of freedom and deep attachment to their native land. About two-thirds are of **Teutonic** origin, and speak the German language. About one-fourth, chiefly in the west, speak French; and a few in the south-east speak Italian. Nearly three-fourths of the people are Protestants; the rest are Roman Catholics. There are four universities, and elementary education is compulsory and free. Switzerland is a **Federal Republic**, consisting of 22 **Cantons**, each of which has its own independent government based upon the principle of the absolute sovereignty of the people. The Federal Government alone has power to declare war or make peace, and retains also the control of the currency and the federal taxes.

658. Towns. **BERNE** (70,000), on the Aar, is the seat of Government. **Geneva** (113,000), at the outlet of the lake, is noted for its watches. **Lausanne** is finely situated on the north of the same lake. **Bâle** or **Basle** (124,000), on the Rhine, in the north, has considerable trade. **Zurich** (175,000), on a lake of the same name, has cotton and silk manufactures, and a noted technical school. **Neuchâtel**, in the west, is on a lake of the same name.

THE GERMAN EMPIRE

659. **THE GERMAN EMPIRE** is situated in Central Europe and is bounded on the north by the North Sea, Denmark and the Baltic; on the east by Russia; on the south by Austria and Switzerland, and on the west by France, Belgium, and Holland. About two-thirds of the boundaries are land frontiers, and only one-third sea-board. The principal States, of which there are 26 in all, are the four Kingdoms of **Prussia** and **Saxony** in the north, **Bavaria** and **Wurtemberg** in the south, and the Grand Duchy of **Baden**, which has as large an area as Saxony though less than half the population.

660. **Surface.** A small part of Germany lies in the snow-capped Alps, but its highest peak does not exceed 9,800 feet. North of this a broad plateau, which is a part of the "Alpine Foreland," extends almost to the right bank of the Danube. Its height decreases towards the north and it ends in fertile plains. North of the Danube are the Central Highlands extending from the **Black Forest** (separated from the Vosges by the valley of the Rhine) northward to the **Harz Gebirge**, and eastward to the **Fichtel Gebirge**. From the latter the **Bohemian Forest** runs south-eastward and the **Erz Gebirge** and **Sudeten Gebirge** to the north-east and east. These three ranges of hills form part of the boundary between Germany and Austria. The lowlands of Germany form part of the vast European plain. They are not broken by any elevation of over 1,000 feet, and slope gently towards the Baltic and North Seas. East of the Elbe swamps and sand-plains predominate, but there are many fertile districts where flax and hops grow readily. West of the Elbe there are fewer sand plains. Along the coast stretch shallow lakelets with muddy beds which are dry at ebb tide. Inland are broad expanses of alluvial land, protected by dykes and known as the Marshes, which are very fertile, the rich soil producing heavy crops of grain as well as excellent pasturage for cattle and sheep.

661. **Rivers.** All the rivers of Germany flow either into the Baltic or the North Sea. The **Rhine** has its source in the east of the St. Gotthard group of mountains, and flows northward to Lake Constance, and thence westward to Basle.

GERMANY

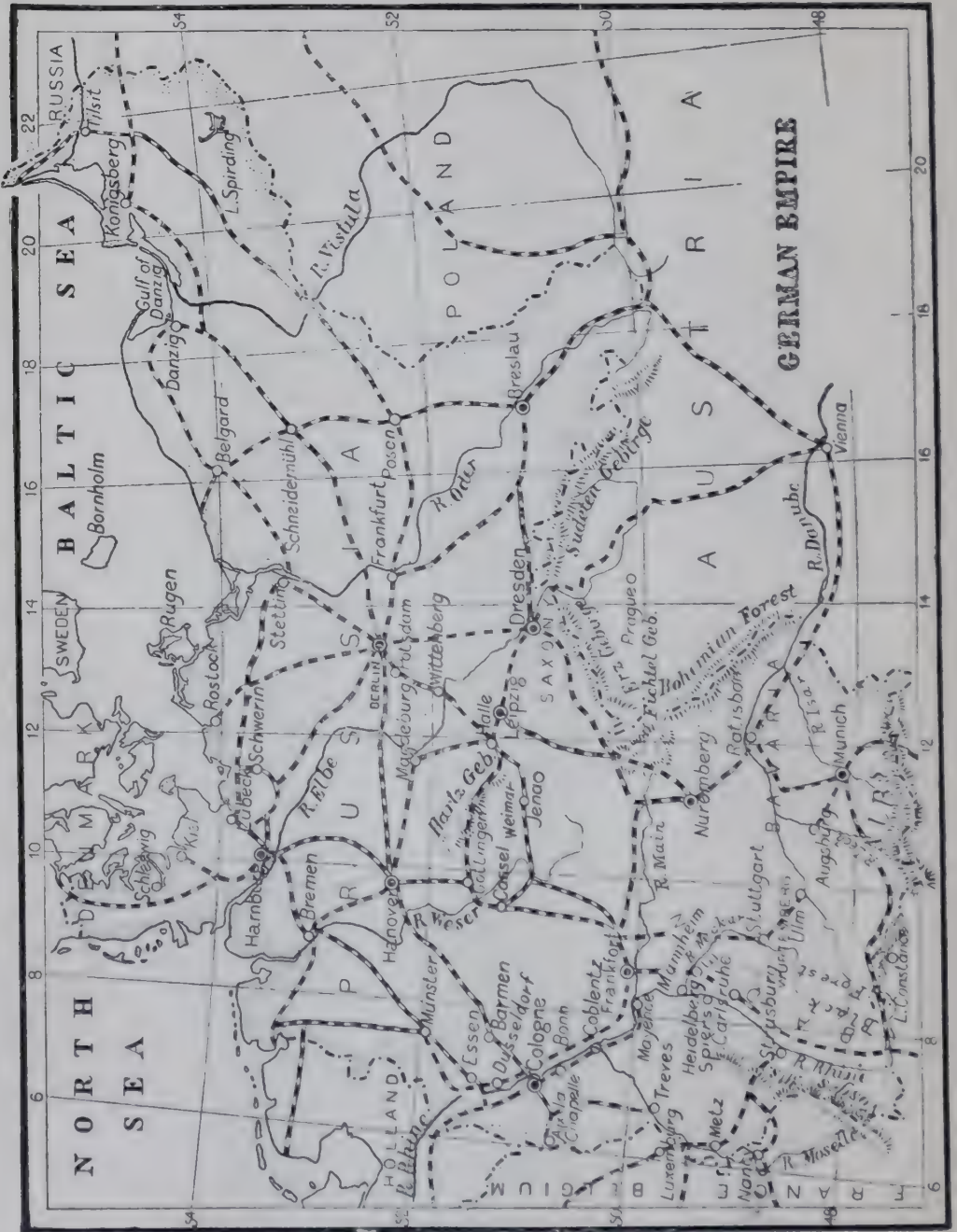


Fig. 132.

passing Schaffhausen where it forms the Falls of that name. From Basle it flows northwards between the Vosges mountains and the Black Forest, receiving on its right bank the **Neckar** at Mannheim and the **Main** from the Fichtel Gebirge at Mainz. At Bingen it makes a sharp bend and then flows between beautiful vine-clad hills as far as Bonn. Below Bonn the bed of the river widens, and at Cologne it has already entered the great plain. Henceforth it flows more leisurely towards Holland, passing Düsseldorf before it bends westward. At Coblenz, between Bingen and Bonn, it receives the beautiful **Moselle** from the Vosges. This river is as long as the Main, and brings down a larger volume of water. Almost as soon as the Rhine has passed the frontier of Holland it divides into several arms, of which the northern, called the **Yssel**, enters the Zuyder Zee, while the main stream, still called the Rhine, flows past Rotterdam into the North Sea.

662. The **Vistula**, 600 miles long, rises in the Carpathians, and flows through Russian Poland, and the province of West Prussia. At Marienwerder its waters divide and form a delta, and its largest arm enters the Baltic near Danzig. Rising in the Sudeten the **Oder** takes a north-westerly course to the Baltic. It is 550 miles in length and with its tributaries drains a great part of Eastern Prussia. The **Elbe** also rises in the Sudeten and flowing north-west past the cities of Dresden, Magdeburg and Hamburg, discharges into the North Sea. The **Weser** rises in the mountains north of the Main. It has only about half the length of the Elbe, yet it drains a large area of North Germany. At Bremen the river begins to widen considerably, and enters the North Sea at Bremerhaven. The **Danube**, the great river of Austria, rises in the Black Forest and flows eastward through Wurtemberg and Bavaria. Only a very small part of its course lies in Germany.

663. **Climate.** The influence of the ocean is but little felt in Germany. The climate is distinctly continental, and in the east is little different from that of Russia. The mean annual temperature of north central Germany is no higher than that of the Lofoden Islands on the west coast of Norway. The ports and salt marshes on the Baltic coast freeze in winter, and though the valley of the Rhine has a higher mean temperature than some of the eastern valleys, yet the river is sometimes frozen so hard as to be safe for transit across the ice as far south as Mainz. The rainfall is heaviest on the southern hills but is pretty evenly distributed over the country and

through the seasons ; and to this fact Germany owes not a little of its agricultural development and success.

664. Natural Products. The country is in general fertile, except in the sandy plains and swampy marshes of the north. *Cereals* and *pulses* form 60% of the produce of the soil. *Potatoes* and *vegetables* are grown in large quantities in the Central Highlands. *Tobacco*, *hops* and *hemp* are also grown. The *vine* is cultivated along the banks of the Rhine and its tributaries from the Moselle southwards, and large quantities of light wine are produced. The forests are very extensive, and the Government pay great attention to scientific forestry. Cattle and horses are reared in great numbers. At one time sheep-rearing was of still greater importance, but it has somewhat declined. In the production of *iron* and *coal* Germany ranks next after the United States of America and Great Britain. The Erz Gebirge furnishes more *silver* than any other single district in Europe. *Zinc*, *lead*, *copper* and *rock salt* are the other principal minerals.

665. Manufactures and Commerce. There are large manufactures of woollen, cotton, silk, and leather goods, as well as of drugs and dyes, in all of which a large export trade is carried on. Iron and steel manufactures are rapidly growing, and machinery of many sorts is exported in considerable quantities. There is also a valuable export of wooden toys and carved articles, made principally in the Harz Mountains and in the neighbourhood of Nuremberg in Bavaria. The chief imports are grain, cotton, wool, cattle, seeds, raw silk, coffee, and petroleum.

666. People. The total population of Germany is over 60 millions, of whom 92 per cent are **Germans** by race. Of the rest a few are **Danes** living in Schleswig, a larger number **French** in Alsace-Lorraine, and about 3 millions are **Poles**. The Germans are a hard-working race, law-abiding, and noted for their devotion to learning. Education is compulsory, and the system of public schools is the best in Europe. There are 21 universities and numberless technical schools. More than one-half of the population are Protestants, and about one-third are Roman Catholics. There are nearly 600,000 Jews, of whom the greater number live in East Prussia.

667. Government. For many centuries Germany has been divided into a number of independent States. In A.D. 800, after

the decay of the old Roman Empire, Pope Leo III., in order to strengthen himself against the Lombards, placed the crown of the "Holy Roman Empire" upon the head of Charlemagne, the great Frankish Emperor. From that time for over 1,000 years an Emperor was generally chosen from among the German princes. The dignity, however, conferred little power, and did more to separate than to unite the German States. The Holy Roman Empire was abolished in 1806, the empty title having for some centuries been almost hereditary in the Austrian house of Hapsburg. From 1815 till 1871 the States were united under the title of the **Germanic Confederation**. During the war with France in 1870-71 all the German States fought side by side, and the great dream of a United Germany was at last realized when the King of Prussia was elected hereditary Emperor by the Princes of the States assembled at Versailles. The Emperor alone can make war or peace, and in war he is the head of both the land and the naval forces. Each State manages its own internal affairs and makes its own laws, but laws enacted by the general parliament (*Reichstag*), take precedence of State laws. To facilitate trade, there is a general Customs League, or *Zollverein*, so that goods pass freely from State to State.

668. Prussia. The Kingdom of Prussia is the largest of the German States. It covers about two-thirds of the total area, and contains over one-half of the population. It extends from Belgium and Holland in the west to Russia in the east, and includes the greater part of the North German plain. *Berlin* (1,000,000), on the Spree, a small affluent of the Elbe, is the capital both of the Kingdom of Prussia and of the Empire. *Potsdam*, west of Berlin, is the Emperor's summer residence. *Stettin*, near the mouth of the Oder, is the first seaport of Prussia, and the port of Berlin. *Danzig*, the second commercial port in the Baltic, lies at the mouth of the Vistula. *Breslau*, on the Oder, the second city in the State, is the centre of the linen manufacture, and has the largest woollen fair in Europe. *Magdeburg*, on the Elbe, is a strong fortress, and has been a flourishing town since the Middle Ages. *Halle*, on a tributary of the Elbe, and *Jena*, south-west of it, are celebrated university towns.

669. Frankfort-on-the-Main (200,000) is one of the wealthiest and handsomest cities in Germany, and a great centre of commercial life. *Coblenz* stands at the junction of the Rhine and Moselle. Further down the river are *Bonn*, with a famous university, and *Cologne*, the greatest commercial town on the Rhine. *Cologne* has steamship communication up and down the river, and is the terminus of eight different railway lines. Its famous cathedral was begun in 1248 and completed in 1520. *Düsseldorf*, on the Rhine, and *Elberfeld*, a little to the east, are great industrial centres, and *Essen* is noted for Krupp's cast-iron and steel works which employ over

70,000 men. The beautiful town of **Hanover** was the capital of the former kingdom of that name. **Kiel**, on the Baltic, is the chief station of the German Baltic Fleet.

670. **BAVARIA** is the second Kingdom in the German Empire both as to area and population. It is the only one of the States whose sovereign has independent control of his armies in time of peace. **MUNICH**, the capital, on the Isar a tributary of the Danube, is famed for its scientific and technical institutions as well as for its university, collections of pictures, and great National Museum. **Augsburg**, on the Lech, another tributary of the Danube, was built by the Romans. **Nuremberg**, in the north-east, is the premier commercial and industrial centre of Bavaria, and an ancient city whose fame reaches back to the Middle Ages. The **PALATINATE**, separated from the main body of the Kingdom by the Grand-Duchy of Baden and the Rhine, contains **Spires** on the Rhine, which has one of the largest and most renowned cathedrals of Germany.

671. The Kingdom of **WURTEMBERG** lies to the west of Bavaria and is bounded on the west by Baden. **STUTTGART**, the capital, is one of the centres of the German book-trade. **Ulm**, on the Danube, is a fortified town of considerable industrial importance.

672. The Kingdom of **SAXONY** extends north of the Austrian province of Bohemia. It is the smallest kingdom in Europe, and is the most densely populated country in the world. **DRESDEN**, on the banks of the Elbe, is the capital. It is famous for its art collections and fine buildings. Dresden china is made at **Meissen**, 15 miles away, at the oldest china factory in Europe. **Leipzig**, in the north-west, is famous for its university.

673. The **Minor States** of Germany include six Grand Duchies, five Duchies, seven Principalities, three Free Cities, and Alsace-Lorraine called the *Reichsland* (province of the Empire). Amongst important towns in the minor States are **Weimar** in Saxe-Weimar, famous for its literary institutions; **Mainz**, a strongly fortified city on the Rhine; and **Carlsruhe**, capital of the Grand Duchy of Baden. **Baden-Baden**, in the Black Forest, is famous on account of its valuable mineral springs. **Mannheim**, at the mouth of the Neckar, is the foremost commercial town on the Upper Rhine. The Rhine is navigable as far as Mannheim for steamers of 2,000 tons. **Heidelberg**, on the Neckar, has the oldest university in Germany. **Strassburg**, with 150,000 inhabitants, is the largest city in Alsace, and is strongly fortified. **Aix-la-Chapelle** is the city at which the Holy Roman Emperors were crowned. It is now an important manufacturing town. **Treves** is an ancient Celtic town, and was once the residence of the Roman Emperor. It has more Roman remains than any other city in Germany.

674. In the 13th century certain Free Cities formed the **Hanseatic League** for the protection of trade and other purposes. At one time there were fifty towns in the League. The only remaining Free Cities are **Hamburg**, on the Elbe, the greatest commercial city on the continent, with 705,000 inhabitants ; **Bremen**, on the Weser ; and **Lübeck**, on the Trave.

AUSTRIA-HUNGARY

675. The EMPIRE OF AUSTRIA-HUNGARY is one of the greatest States of Europe, and ranks second as to area and third as to population. It is mainly an inland State, for only about one-sixth of its boundaries are formed by the sea. To the west lie Italy, Switzerland, and Bavaria, to the north Saxony, Prussia, and Russia ; to the east Russia ; and to the south Roumania, Servia, the Adriatic, and Italy.

676. **Surface.** No country in Europe has so extensive a mountain frontier as Austria-Hungary or includes so many high ranges. The **Eastern Alps** extend from the borders of Italy and Switzerland to Vienna and Pressburg on the Danube, and through the Adriatic Provinces they are continued as the **Karst** and the **Dinaric Alps**. The **Bohemian Forest**, the **Fichtel Gebirge**, **Erz Gebirge** and **Sudeten** enclose the extensive plateau of Bohemia on three sides. The **Carpathians** mark the boundary between Hungary and the province of Galicia, and from their southern point continue westward as the **Transylvanian Alps**, separating Hungary from the Roumanian Province of Wallachia, till at the Iron Gate of the Danube they meet the **Balkans** at the north-east corner of Servia. The narrow strip of Austrian coast-line, extending 300 miles down the Adriatic is mainly rocky, and is fringed by innumerable islands of which the most important are **Lesina**, famous as a health resort, and **Lissa** a naval station.

677. **Rivers.** The great river of Austria-Hungary is the **Danube**. It is the main artery of the country, for into it pours the drainage of almost every part. It enters Upper Austria at the point where it receives the **Inn** from Switzerland, and flows east past Linz and Vienna to Pressburg through a fruitful plain called the *Vienna Basin*. From Pressburg to Waitzen its course lies through the *Upper Hungarian plain* where it

AUSTRIA-HUNGARY

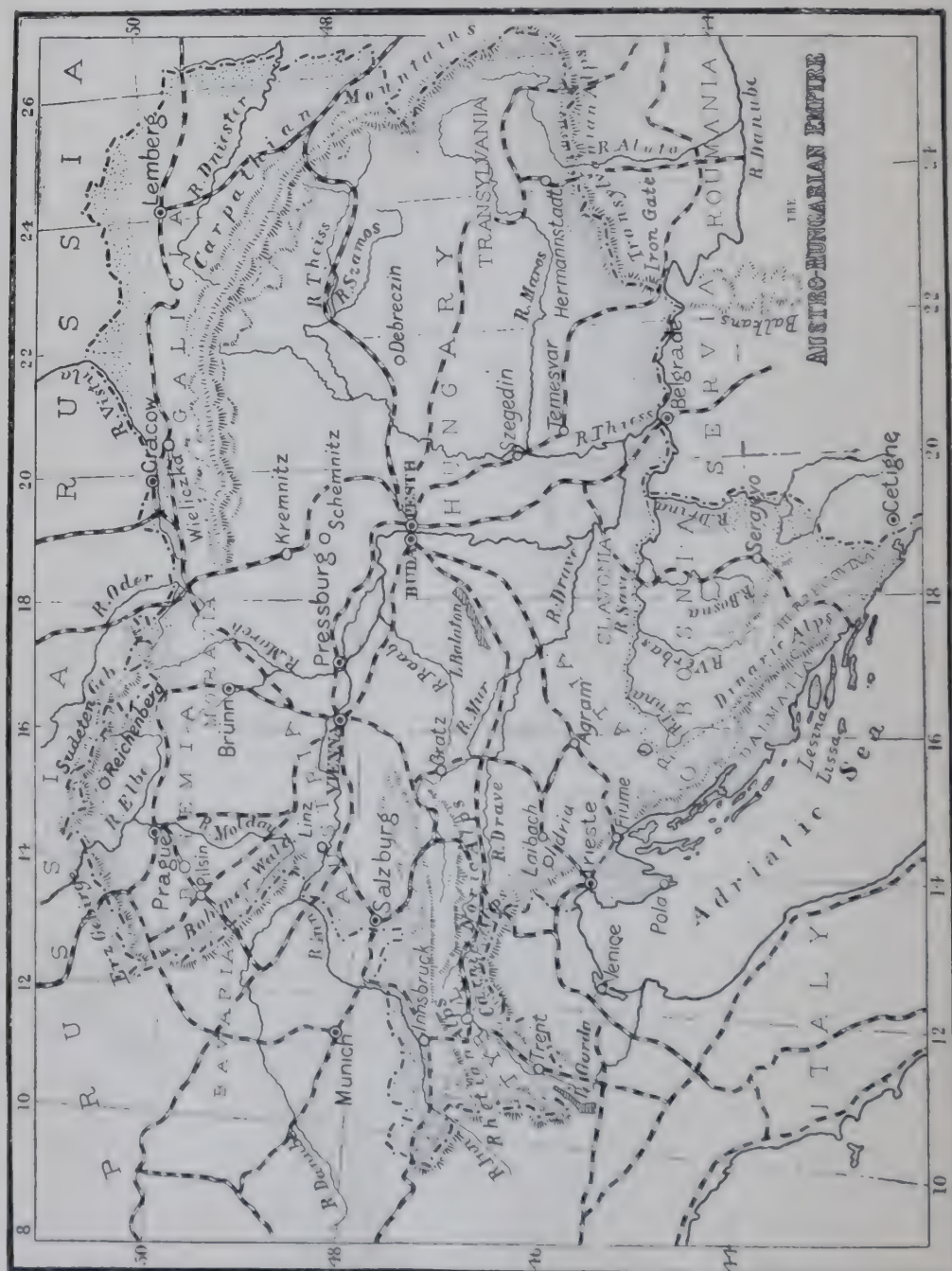


Fig. 133.

receives the **Raab** from the south, then turning due south it flows past Buda-Pesth, the capital of Hungary, draining the *Lower Hungarian plain*, 30,000 square miles in extent. Here it is joined by its three great tributaries, the **Drave** from the Eastern Alps, the **Save** from their south-eastern continuation, and, on its left bank, the **Theiss** from the Carpathians. After it has received the Save the Danube keeps an easterly course to the **Iron Gate** (see § 562). The Drina, a tributary of the Save from the south, forms the boundary between Servia and Bosnia. The **Moldau** rises in the Bohemian Forest and flows northward to the **Elbe**, which rises in the Sudeten. The **Oder** from the Sudeten runs only a small part of its course on Austrian soil. The **Vistula**, which rises in the western Carpathians, forms the boundary between Austria and Germany for a considerable distance. The **Dniester** and the **Pruth** rise in the central Carpathians, and flow south-eastwards. The **Adige** rises in the Tyrol and, flowing southwards into Italy, passes Verona and enters the Adriatic a little to the north of the Po.

678. Climate. There is much diversity in the climate of Austria-Hungary. The mountains in the east and north are high enough to cause a heavy rainfall when south-west winds prevail, but not sufficiently high to keep out the cold north and east winds. In the northern provinces, therefore, abundant summer rains and very cold winters are experienced. In the great plain of Hungary the summer is very hot and dry, and the winter extremely cold. The rainfall on the plain is less than 25 inches a year, while on the Carpathians it is about 48 inches.

679. Natural Products. Large quantities of excellent *wheat* are grown, especially in the drier provinces. *Beetroot*, *potatoes*, *oil-seeds*, *flax*, *hemp*, *tobacco* and *hops* are largely cultivated. The *grape-vine* flourishes in many parts, and the *wine* produced in the neighbourhood of Tokay is world-renowned. The *mulberry-tree* is extensively grown for the rearing of silk worms, and the production of *silk* is considerable. There are valuable forests on the mountain slopes, and on the Alpine Foreland good pasturage is found for sheep and cattle. But the most extensive pasture land is on the *Pushtas*, or grass-steppes of Hungary, where large numbers of horses and cattle are reared.

680. Austria-Hungary is rich in minerals. It produces more *gold* and *silver* than any other European country except Russia. *Quicksilver* is obtained in considerable quantities. *Copper*, *iron*, *lead*, and *coal* are found in several districts. The *salt* mines, near Cracow, are the largest in the world. *Opals* are found in Hungary. There are many mineral springs among which those of Carlsbad and Marienbad enjoy world-wide fame.

681. People and Industries. Austria-Hungary has over 47 million inhabitants. The three predominating races are **Slavs**, over 21 millions, **Germans**, over 11 millions, **Magyars** and other **Mongoloid** races nearly 9 millions. There are also nearly 4 million **Roumanians**, and scattered throughout the Empire are **Bulgarians**, **Armenians**, **Jews** and **Gipsies**. Twenty different languages are spoken in Austria-Hungary, and this diversity has no doubt been one of the chief barriers to a real union of the Provinces. Agriculture is the chief industry. Linen, cotton, and woollen goods, hardware, and glass, are the principal manufactures. The foreign commerce is not very large, but is steadily growing. Wheat, and wheat flour, woollen manufactures, glass, sugar, timber and paper are the chief **exports**; raw cotton, wool, tobacco, coffee and grain the chief **imports**.

682. Government. Austria-Hungary is a dual State whose Sovereign is *Emperor of Austria* and *King of Hungary*. He accordingly has two capitals, **Vienna** in Austria and **Buda-Pesth** in Hungary, both on the Danube, and is supposed to reside in each for six months of every year. Hungary is separate from Austria in its internal Government.

683. Towns. VIENNA (2,000,000), the capital of Austria, lies on the right bank of the Danube. It is not only the seat of the Imperial Government, and the centre of the industrial and commercial activity of the Empire, but is also one of the most beautiful cities of the world, rich in museums, picture galleries and historic collections of all kinds. It is the seat of a university established in 1305, and has been the capital of the House of Hapsburg, the present reigning House, since 1276. The twin-town BUDA-PESTH (710,000), is the capital of Hungary. It is situated on both banks of the Danube and is the seat of a university and a great centre of trade and industry. **Pressburg**, the old capital, is also on the Danube.

684. **Prague** (500,000), the capital of Bohemia, is a fine city on the banks of the Moldau. Its university was founded by Charles IV. in 1348. **Linz**, on the Danube, is the principal town of Upper Austria, and has considerable importance as a commercial and manufacturing centre. **Gratz**, on the Mur, an affluent of the Drave, is noted for its steel. **Innsbruck**, on the Inn, a tributary of the Danube, is the chief town of the Tyrol. It has a university and contains many historic monuments. **Idria** has large quicksilver mines. **Trieste**, on the Adriatic, is the premier seaport of the Empire. The principal manufacturing town in Bohemia is **Reichenberg**, where woollen fabrics are made. **Pilsen**, in the north-west, has large coal mines. **Brünn**, the largest town in Moravia, with 110,000 inhabitants, is the centre of the woollen industry. **Cracow**, on the Vistula, was the former capital of Poland. To the south of Cracow are the salt mines of **Wieliczka**, the most extensive in the world. In the western Carpathians lie **Schemnitz** and **Kremnitz**, the most important mining towns of Hungary. **Fiume**, on the Adriatic coast, is a rising manufacturing town, and the first seaport of Hungary.

685. **BOSNIA** and **HERZEGOVINA** were provinces of Turkey, and were placed under the government of Austria-Hungary by the Berlin Conference in 1878. In defiance of treaty engagements they were formally annexed by Austria in 1908. Turkey ultimately consented to the annexation in consideration of an indemnity. They lie south of the Save and west of Servia and Montenegro, and have a population of 1,600,000, who are chiefly engaged in agricultural and pastoral pursuits. Bosnia is the chief sheep-rearing country in Europe. The forests are extensive and timber is exported. Wheat, maize, flax, and hemp are grown. Both provinces have considerable mineral wealth, but as yet it is little worked. **Serajevo** is the chief town of Bosnia.

686. The Principality of **LIECHTENSTEIN** is a small independent State situated between Switzerland and Austria. It has an area of only 65 square miles, and a population of under 10,000.

RUSSIA

687. **EUROPEAN RUSSIA** occupies the whole of the eastern half of Europe from the Arctic Ocean on the north to the Black Sea on the south, and is bounded on the west by Sweden, the Baltic, Prussia, Austria and Roumania. It forms a vast continental territory of nearly two million square miles, with proportionately but little sea board and that of very secondary

RUSSIA IN EUROPE

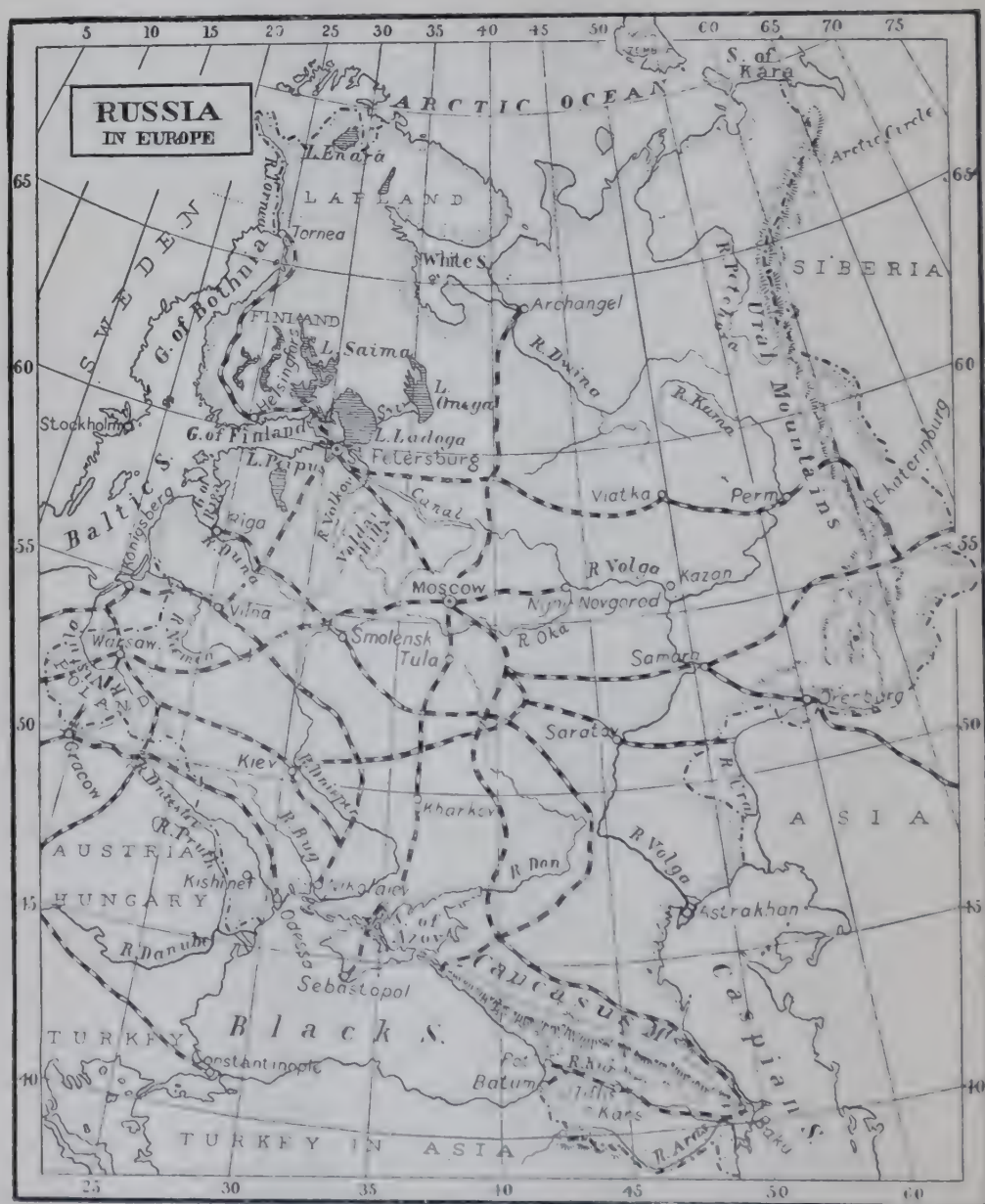


Fig. 134.

value. Its Arctic coast is far removed from the trade routes of the world, as well as from the main centres of Russian life, and is closed by ice for most of the winter. The Baltic ports are also ice-bound for several months of the year. The other ports are on the Black Sea, and are somewhat more favourably situated. But both the Baltic and the Black Seas are inland seas whose entrance is practically controlled by other Powers. No other great nation is so unfavourably situated for sea traffic or in such danger of being hemmed in in time of war.

688. Surface. Russia extends in an almost unbroken plain from north to south, and from east to west. The **Valdai Hills**, south-east of the Gulf of Finland, whose highest point is only 1150 ft., are the only break in the level monotony west of the Urals. Along the shores of the Arctic Ocean stretches a belt of treeless **tundras** - marshy land frozen during the greater part of the year, and always frozen a few feet below the surface. Between the tundras and the latitude of St. Petersburg is a broad **forest belt**, from which a large part of the population draw the timber for their wooden houses. South of the forests lies agricultural Russia, where cereals of all kinds grow in abundance, and the fruits of Central Europe ripen to perfection. Between this and the Black Sea lies a region of pasture land mostly devoted to the rearing of cattle. It is treeless, and suffers much from drought in summer.

689. Rivers. From the Valdai Hills spring most of the great rivers of Russia. The **Volga**, the largest river of Europe, 2,200 miles in length, flows east and south till it reaches the Caspian Sea. With its large tributaries the **Oka** and the **Kama** it is the most important waterway of Eastern Russia. The **Düna** rises in the Valdai Hills and the **Niemen** further south, and both flow into the Baltic. The **Dnieper** and the **Don** also rise in the Valdais, but take a southern and longer course to the Black Sea. The **Dwina** and **Petchora** rise in the Ural Mountains and flow into the Arctic Ocean; the **Vistula** and **Dniester** drain the northern and eastern Carpathians and flow respectively into the Baltic and the Black Seas. The **Ural River** comes down from the Ural Mountains and pours its waters into the Caspian. The sources of the Russian rivers being at low elevation their current is slow and they are consequently well adapted for navigation through almost their entire course. As railways are comparatively few the rivers

constitute commercial highways of the greatest importance, especially as they are linked together by a great network of canals. There is unbroken water communication between the Baltic and the Caspian. **Lake Ladoga**, north of St. Petersburg, is the largest lake in Europe, but, like all the other lakes of northern Russia, it is shallow and swampy. It is drained by the **Neva** into the Gulf of Finland, and the river **Svir** connects it on the north-east with **Lake Onega**.

690. Climate. Owing to the fact that there are no great mountain ranges to divert the icy winds that blow from the Arctic regions the great plain is subject to extreme cold in the winter months. The Baltic is excluded from the genial influence of the Gulf Stream, and in winter its ports are closed by ice while the most northerly ports of Norway remain open. The climate of Russia is continental throughout. The range of temperature is great everywhere, and in all but the southern provinces the winters are long and severe. The **rainfall** is scanty on the south-east except along the slopes of the Caucasus Range.

691. People. The bulk of the population belong to the **Slavonic** race. They include all the **Russians** proper, 80 millions in number, the **Poles**, 15 millions, and the **Bulgarians** who occupy the province of Bessarabia east of the Carpathians. **Finns**, **Germans**, and **Jews** are numerous in the west, and the south-eastern districts contain wandering tribes of **Mongolian** descent. The **Lithuanians**, south of the Gulf of Finland, speak a language more like Sanskrit than is any other European tongue. The Russians are behind the rest of Europe in civilization. Until 1861 the peasants were serfs, bought and sold with the estate on which they lived. The Government of Russia has for many centuries been an Absolute Monarchy, and though a nominal Constitution has now been granted and a representative body called the Duma convoked, the Czar is still practically an autocratic ruler. The Russians belong to the Greek Church, which is established by law.

692. Natural Products. South of the vast forest region, the largest in Europe, is a zone producing *rye*, *oats*, *flax*, and *hemp*. Stretching across the centre of the country from east to west, is a region of rich black earth, resembling the black cotton soil of India, where vast quantities of *wheat* are grown. *Maize* and the *rune* flourish in some parts of the south, but

much of southern Russia consists of treeless steppes occupied by wandering Tartar tribes. *Sheep, oxen, and horses* are reared in great numbers. The *sable* and *ermine*, valuable for their fur, are found in the north. *Iron, copper, gold, platinum, coal, petroleum* and *salt* are the principal mineral products. The Ural Mountains are richer in minerals than any other chain in Europe. The chief manufactures are cloth, leather, and cordage. Wheat, flax, timber, oil-seeds, hemp, kerosene oil, and wool, are the chief **exports**; metals, cotton, tea, clothing, and wines, are the chief **imports**.

693. Towns. ST. PETERSBURG (1,300,000), the capital, founded by Peter the Great in 1703, is a splendid city with many handsome buildings. It stands on the Neva and is connected with the Gulf of Finland by a deep ship-canal. **Moscow** (1,000,000), the former capital, was burnt by its citizens in 1812 that it might not fall a prey to Napoleon, but it has been rebuilt. It is situated in the heart of Russia, and is connected with St. Petersburg by rail.

694. Odessa, on the Black Sea, is the greatest commercial city in the south. Wheat is its principal export. **Warsaw**, on the Vistula, is the capital of Poland, once a powerful kingdom. **Kronstadt**, on a small island at the mouth of the Neva, is strongly fortified, and is the principal station of the Russian Baltic Fleet. **Archangel**, on the White Sea, at the mouth of the Dwina, was formerly the only port of Russia. **Riga**, on the Gulf of Riga, near the mouth of the D  na, has a large export trade and is the third seaport in the Empire.

695. The RUSSIAN EMPIRE includes about one-third of Asia, as well as more than half of Europe. Its total area is about $8\frac{1}{2}$ million square miles, with a population of about 130 millions. It is the second empire in the world in extent and the third in population.

ROUMANIA

696. The KINGDOM OF ROUMANIA is composed of the two ancient principalities of **Wallachia** and **Moldavia**, and the much smaller province of **Dobruja**. Dobruja extends from the Black Sea westward to the Danube and includes the delta of that river. Wallachia extends westward to the Iron Gate, and includes all the country between the Danube and the Transylvanian Alps. Moldavia stretches northwards between the

Carpathians and the river Pruth, and separates Hungary from southern Russia.

697. Surface and Products. Between the Danube and the lower slopes of the Transylvanian Alps stretches the broad Wallachian plain, marshy near the river. Moldavia consists chiefly of a low undulating plateau, and Dobruja of a broad stretch of grassy steppe, high enough to force the Danube to change its course. Roumania is extremely hot in summer, but in winter it is often so cold that the mouths of the Danube are blocked by ice. The fertile plateau of Moldavia produces great crops of *maize*, *wheat* and *beetroot*. *Cattle* and *sheep* are reared in large numbers. *Petroleum*, *copper*, and *rock-salt* are obtained in the Carpathians.

698. People and History. Roumania was colonised by the Romans from whom the people claim to be descended. Wallachia and Moldavia were independent States till subjugated by Turkey. They were formed into the Principality of Roumania in 1859, and made independent of Turkey by the Congress of Berlin in 1878. BUKHAREST, the capital (280,000), is a strongly fortified town. It has considerable trade and is the seat of a university. Four lines of railway meet here. One runs north through Moldavia, another west to the Iron Gate and Buda-Pesth, and the others south and east to the Danube.

BALKAN PENINSULA

699. The BALKAN PENINSULA is the most easterly of the three large peninsulas that stretch southward into the Mediterranean. The west coast is washed by the Adriatic and the Ionian Seas, connected by the Straits of Otranto; the Ægean Sea, the Dardanelles, the Sea of Marmora, and the Straits of Bosphorus divide it on the south-east from Asia Minor, and the north-eastern coast is on the Black Sea. The peninsula includes the European provinces of the Turkish Empire, or **Turkey proper**; **Bulgaria**, with **Eastern Roumelia**; **Servia**; **Bosnia** and **Herzegovina**; **Montenegro**; and **Greece**. Bosnia and Herzegovina are now included in the Austrian Empire.

700. Surface. The peninsula is mountainous throughout. The **Balkans** stretch southward from the Iron Gate of the Danube and then bend to the east, ending in **Cape Emineh** on the Black Sea. South of the Balkans, and separated from

them by the valley of the Maritza, are the **Rhodope Mountains**, whose highest peak, **Rilodagh**, is about 10,000 feet. The **Dinaric Alps** stretch along the west coast and are continued in numerous minor ranges to the south of Greece. West of the river Vardar, which enters the Gulf of Salonika, runs the **Shardagh Range**, with a peak 10,000 feet high. Southward the **Pindus Mountains** divide Greece into a western and eastern part. **Olympus**, the chief mountain of Greek Mythology, 9,800 feet high, is west of the Gulf of Salonika. The southern coasts of the peninsula are rocky and deeply indented, and abound in good natural harbours.

701. Rivers. The rivers of the peninsula are for the most part small. The **Maritza** alone is navigable. It flows eastward through the Plain of Roumelia to Adrianople, then south to the Aegean. The valley of the Maritza has always formed the chief line of land communication between east and west, and along it the railway to Constantinople now runs. The **Struma** and the **Vardar** flow south from the Balkans and the Shardagh Mountains. The northern drainage of these ranges is by numerous small rivers northward to the Danube and by the **Morava** north-westward to the Save.

702. Climate and Products. Though the summers are hot, the winters are comparatively severe. The rainfall is fairly abundant and occurs at all seasons. June is the wettest month. The soil is fertile, but agriculture is backward. The Ionian islands produce a good deal of *wine*, and the small grapes grown in central Greece are dried and exported as *currants*. *Wheat*, *maize*, *olives*, and *tobacco* are grown in the plains. The silkworm is reared, and *silk* is exported in large quantities. The peninsula is famous for its roses, and *attar of roses* is an article of export. *Sheep* are reared in great numbers and *pigs* in the oak forests of the Balkans.

703. People and History. In ancient times the Balkan peninsula was inhabited by the **Greeks** in the south, **Thracians** in the north-east and **Illyrians** in the north west. Till conquered by the Romans in 146 B.C., the Greeks excelled all other nations in arts, civilization, and commerce. When the Roman Empire was divided in 305 A.D., the **Eastern or Byzantine Empire** developed rapidly, and its capital Constantinople became famous as a seat of learning and a centre of trade. When the Byzantine Empire began to decline **Slavs** from the north invaded the Danubian districts, and, amalgamating with the Thracians, became the ancestors of the mixed races

BALKAN PENINSULA

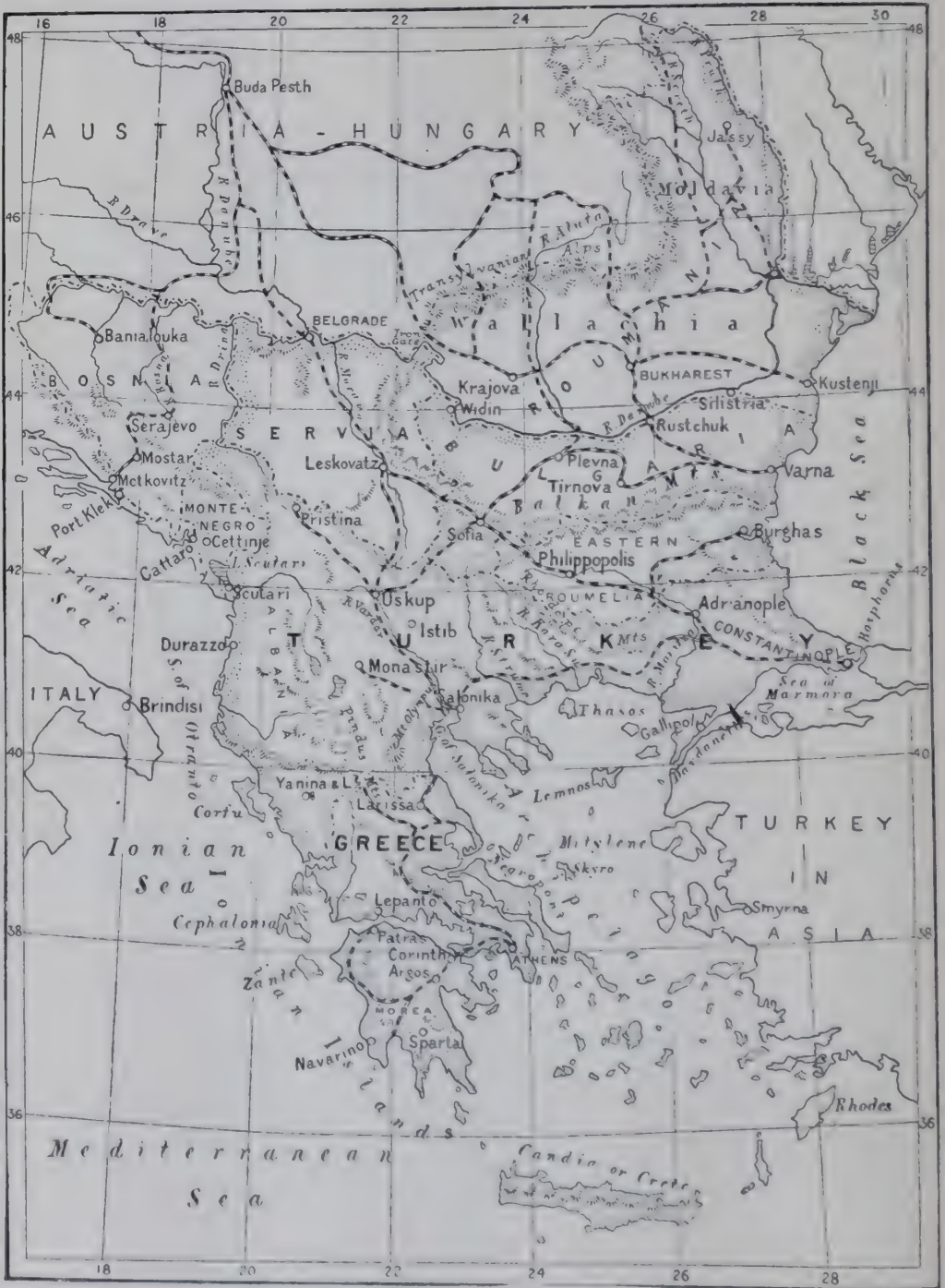


Fig. 135.

known as **Servians** and **Bulgarians**. The **Albanians** of the west are descendants of the ancient Illyrians. From 1358 A.D. onwards the **Osmanlis**, or **Turks**, a Mongol tribe of Asia Minor, made inroads into the Balkan Peninsula. In 1453 they took Constantinople and, under the name of **Stamboul**, made it the capital of their Empire, which included the whole of the Peninsula as well as South Russia, Roumania, and Hungary. The decay of the Turkish Empire began with the loss of the **Battle of Lepanto** in 1571 against Don John of Austria. **Greece** became an independent Kingdom once more in 1829; and by the Congress of Berlin in 1878 **Roumania**, **Servia**, **Montenegro**, and **Bulgaria** were freed from the Turkish yoke, and **Bosnia** and **Herzegovina** were put under the authority of the Austrian Empire. **Eastern Roumelia**, which in 1878 was made a province of Turkey, was annexed by Bulgaria in 1885.

TURKEY

704. **EUROPEAN TURKEY** extends from the Black Sea to the Adriatic and is bounded on the north by Bulgaria and Servia, and on the south by Greece. Though the head of the Ottoman Empire it is much the smallest part of it, having an area of only 65,700 square miles, and a population of little over 6 millions, of whom half are Christians of the Greek Church, and half Muhammadans. The Sultān was until recently an absolute monarch, limited only by the tenets of Islām as expressed in the Korān. A Constitution has, however, just been granted, and is being put into execution (1908).

705. Chief towns. **CONSTANTINOPLE**, or **STAMBOUL**, (1,203,000) the capital, is situated on the Bosphorus. It is built on a triangular promontory bounded on the north by the **Golden Horn**, one of the best harbours in the world, and so deep that warships can anchor close to the shore. The situation of the city is extremely beautiful, and with its many minarets and gilded domes it presents a striking spectacle from the sea. Many of the modern streets are handsome, but in some parts the houses are chiefly of wood. The **Seraglio** encloses the residence of the Sultān. Its principal gate is called the **Sublime Porte**, a term often applied to the Turkish Court. **Salonica**, on the Gulf of the same name, ranks next to Constantinople as a seaport. It is the Mediterranean port for the export trade of Hungary.

706. The Island of CRETE, or CANDIA, has a separate government under Prince George of Greece. It is a beautiful, fertile island, and exports largely all kinds of fruits, especially olives. **Candia**, in the north, is the chief town.

BULGARIA

707. By the Congress of Berlin in 1878 Bulgaria was made a self-governing Principality under the Suzerainty of Turkey. Having annexed **Eastern Roumelia** in 1885, and greatly increased his military strength, the Prince proclaimed his independence in 1908, and assumed the title of **Czar of the Bulgars**. Bulgaria is inhabited by an active and intelligent people who are making rapid progress. **Sofia**, the capital, is in the Central Balkans on the main line of railway which runs east to Constantinople. **Varna**, on the Black Sea, is the principal seaport, and is connected by rail with Sofia.

SERVIA

708. The KINGDOM OF SERVIA lies between Bosnia and Bulgaria and is bounded on the north by the Danube and the Save. The fruitful valley of the **Morava** crosses it from south-east to north. The population, numbering about $2\frac{1}{2}$ millions, are chiefly engaged in agriculture. **Belgrade**, the capital, on the Danube is connected by rail with Constantinople and Salonika. Its famous fort called "the Key of the Danube," is built on a precipitous hill.

MONTENEGRO

709. The Principality of MONTENEGRO, north of Albania, has an area of only 3,600 square miles and a population of a quarter of a million. The Montenegrins are all soldiers, and owing to their bravery and love of freedom their country has never been subject to Turkey. The capital is **Cettinje**, an almost inaccessible mountain town.

GREECE

710. GREECE is bounded on the north by Turkey ; on the west and south by the Mediterranean ; and on the east by the **Ægean Sea**. It includes the ancient **Hellas**, or continental Greece ; the **Morea**, or peninsular Greece ; **Thessaly** and part of **Epirus**, ceded by Turkey in 1881 ; and numerous islands the chief of which are **Negropont**, the ancient Eubœa, off the east coast, the **Cyclades** in the **Ægean**, and the **Ionian Islands**. The area is about 25,000 square miles, and the population $2\frac{1}{2}$ millions.

711. The greater part of Greece is composed of rugged mountains separated by beautiful and fruitful valleys. The coasts are indented with deep bays and gulfs and studded with small islands. No other country has so long a coast line to so small a surface, and the Greeks are naturally, therefore, a nation of seamen and traders. The climate is temperate and healthy. *Maize, wine, oil, and silk* are produced in considerable quantities, but the country is mainly pastoral. The *sheep and goats*, which are very numerous, are pastured on the mountains in summer, and on the plains in winter. Mount Hymettus in Attica yields the finest *honey and wax*. The country contains valuable forests. The manufactures are inconsiderable, but the commerce is extensive. Currants and olive oil are the chief **exports**; grains and cotton goods the chief **imports**.

712. **Towns.** ATHENS (110,000), the capital, situated to the north of the Gulf of Ægina, was the birthplace of the most renowned orators, philosophers, painters and sculptors of ancient times. The modern city still contains many magnificent remains of antiquity. **Piræus**, the port of Athens, is seven miles distant and is connected with it by rail. **Patras**, near the entrance of the Gulf of Corinth, is the principal seaport.

ITALY.

713. The KINGDOM OF ITALY is largely a peninsular State. It is bounded on the east by the Adriatic with the Gulf of Venice in the north, on the south by the Mediterranean; on the west by the Tyrrhenian Sea, the Gulf of Genoa, and France; and on the north by Switzerland and Austria. Out of a frontier of about 5,200 miles over four-fifths is sea, and as the coasts in the south and west are much indented, and the openings protected by bold cliffs and capes, harbours are both numerous and safe. No country in the Mediterranean is so favourably situated for sea trade as Italy, for it commands the southern outlets of the principal trans-continental trade-routes, and offers easily accessible harbours to the shipping of all nations passing through the Suez Canal. The total area of the country (including the islands) is over 114,000 square miles, and the population about 32½ millions.

714. **Surface.** In the north is the Plain of Lombardy, drained by the rivers **Po** and **Adige** and several smaller streams

which flow into the Gulf of Venice. The **Po** rises in Mount Viso on the frontier of France, and flows eastward into the Adriatic. From the Alps, which form the northern and western boundary of the plain, it receives its largest tributaries. Several of these flow through long lakes in the lower Alpine forelands, especially the **Ticino** through **Lake Maggiore**, the **Adda** through **Lake Como**, and the **Mincio** through **Lake Garda**. From the Apennines, which form the southern boundary of the Plain, the Po receives the **Tanaro** and the **Trebbia**, large tributaries but without the volume of those rising in the glaciers of the Alps.

715. Peninsular Italy is shaped like a boot; **Calabria**, its toe, and **Apulia**, its heel, being separated by the **Gulf of Taranto**. The **Apennine Mountains** running through the peninsula from north-west to south-east form its watershed, and as they approach nearer the coast on the east than on the west the rivers flowing into the Adriatic are shorter than those entering the Tyrrhenian Sea. North of the Gulf of Taranto the range divides, one part extending into the Apulian peninsula, the other into Calabria. At the **Straits of Messina** the Calabrian range dips beneath the sea and reappearing in **Sicily** runs along the north coast of the island. Immediately south of the chain is a volcanic peak, **Mount Etna**, 10,835 feet high. The highest point in the central part of the Apennines is **Gran Sasso**, 9,500 feet. Secondary ranges run southward from the main chain, separating the valleys of the **Arno**, the **Tiber**, and the **Volturno**. These ranges contain many extinct volcanoes and several small crater-lakes. On the Bay of Naples is the active volcano **Mount Vesuvius**, 4,200 feet high. The first recorded eruption of Vesuvius took place in 69 A.D., when the cities of **Herculaneum** and **Pompeii** were buried.

716. The Kingdom of Italy includes the island of **Sicily**, divided from Calabria by the Straits of Messina; the neighbouring volcanic **Lipari Islands**, of which **Stromboli** has a small active volcano; **Sardinia**, divided from Corsica by the Straits of Bonifacio; and the smaller islands **Elba**, **Ischia**, **Capri**, and others. Sicily and South Italy have frequently been devastated by disastrous earthquakes. One of unequalled severity occurred on December 28th, 1908, by which the towns of Messina, in Sicily, and Reggio, on the Calabrian coast, were completely destroyed, and 200,000 lives lost.

ITALY*

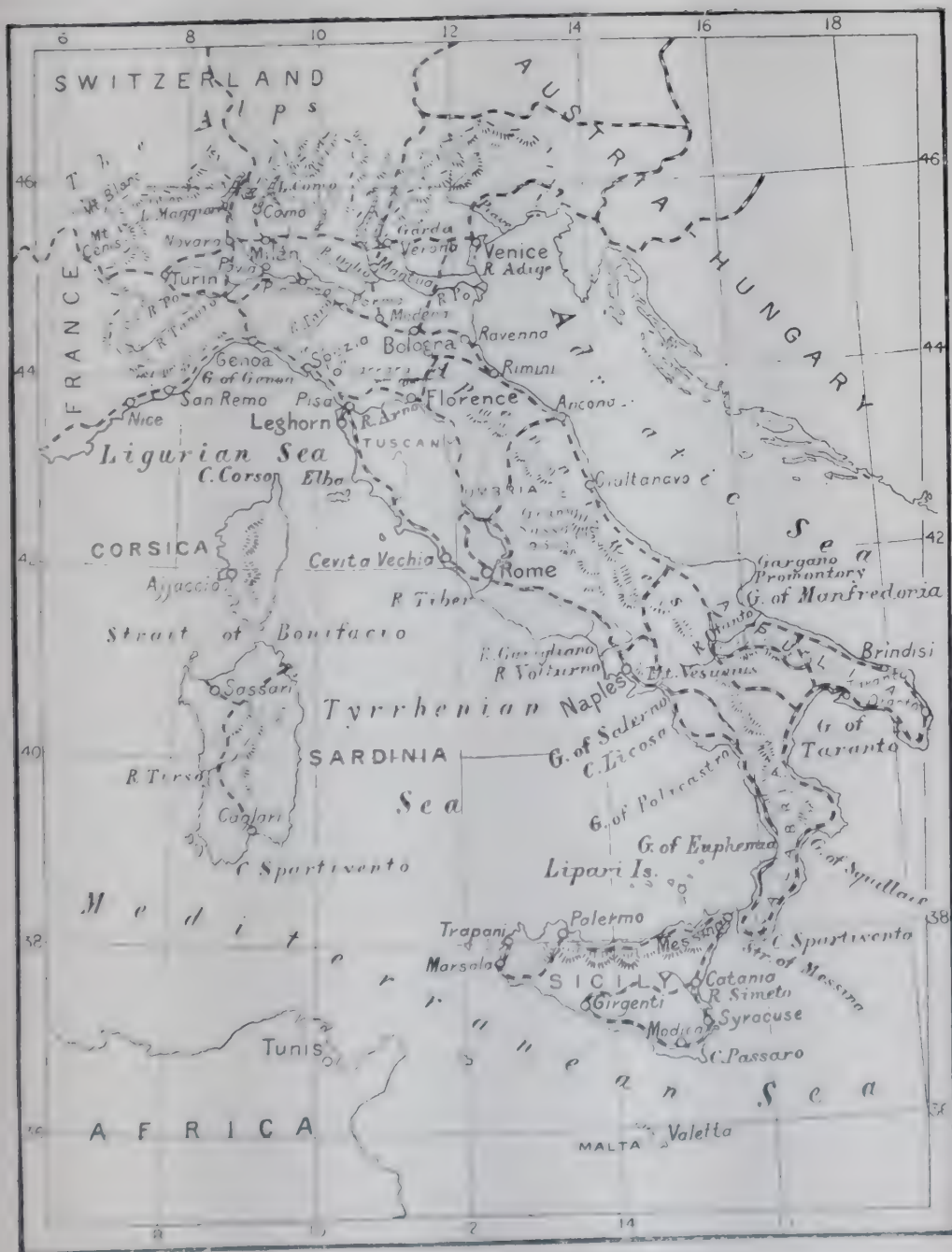


Fig. 1.6)

717. Climate. Italy is noted for its clear blue sky and its genial sub-tropical climate. The Alps protect it from the cold north winds that sweep over the continent of Europe, and the winters are, therefore, seldom cold, while the summers are hot and dry. Its southern provinces are sometimes visited by the hot *sirocco* from the Sahara.

718. People. The Italians are a very mixed race, chiefly descended from the ancient Romans and Greeks with a considerable mingling of Teutonic blood. Their language, derived from the Latin, is very musical. The Government is a **limited monarchy**. There are two houses of parliament, the **Senate**, whose members are appointed by the King, and the **Chamber of Deputies**, elected by the people. For many centuries after the downfall of the Roman Empire Italy was divided into numerous States, and the union of the entire country under one king dates only from 1870.

719. Natural Products and Commerce. In northern Italy **maize** is grown in large quantities, and **rice** in the Plain of Lombardy. The **grape vine** is cultivated everywhere, and no country in Europe produces more wine. **Oliveyards, orange, citron, fig, and chestnut-gardens** abound in the central and southern districts. Italy produces more **silk** than any other European country. **Sponges and corals** are obtained off the coast of Sicily. Carrara, north of Leghorn, yields a famous **white marble**, and Sicily and Umbria yield **sulphur**. Manufactures are few owing largely to the lack of coal. The foreign commerce of Italy is over £150,000,000 a year, and is steadily increasing. The **imports** are coal, cotton, iron, machinery, and grain; and the **exports**, silk, wine, olive oil, eggs, sulphur and hemp.

720. Chief towns. **ROME** (462,000), on the Tiber, was the mistress of the ancient world, and since 1870, when the Pope was deprived of his temporal power, has been the capital of united Italy. It contains majestic ruins, and the Church of St. Peter is the finest cathedral in the world. Ancient Rome stood on seven hills, but the modern city is chiefly built on the plain, the ancient *Campus Martius* (Plain of Mars). The palace of the Vatican, the residence of the Pope, contains some noble paintings by Michael Angelo and Raphael. Rome is unhealthy in summer owing to malaria. **Civita Vecchia** is the seaport of Rome.

721. Naples (563,000), stands on a beautiful bay and is the largest city in Italy. It is an important commercial town and a port of call for several lines of steamers trading to the East. Vesuvius lies to the eastward at a distance of ten miles.

722. Milan (491,000), in the north, on a tributary of the Po, is an important manufacturing and commercial city, and has a splendid cathedral. **Turin**, the capital of Piedmont, situated on the Po, is a fine city, with manufactures of silk. **Genoa**, "The Superb," on the coast of the Gulf to which it gives its name, was long the capital of a republic, and is the principal seaport of Italy. Its manufactures of silk and velvets are important. Columbus was born near Genoa. **Venice** is built on a number of islets at the head of the Adriatic. Canals serve as streets, and boats, called gondolas, as carriages. During the middle ages it was the richest commercial city in Europe, and the head of a powerful republic.

723. Padua, west of Venice, has a celebrated university. **Verona** on the Adige, and **Mantua**, on the Mincio, still farther west, have strong fortresses. **Florence**, called "The Beautiful," is situated on the Arno, and contains noble collections of paintings and sculpture. **Pisa**, near the mouth of the Arno, was the birthplace of Galileo, and is famed for its leaning tower. **Bologna** has the oldest university in Italy. **Brindisi**, on the Adriatic, is an ancient seaport at which Indian mail steamers now call.

724. SICILY, the largest and most fertile island in the Mediterranean, was formerly called the *Granary of Italy*. **Palermo**, the capital, on the north-west coast, is a fine city with a university. **Messina**, on the straits of the same name, was the chief commercial city of the island till it was destroyed by the terrible earthquake of 1908. **Syracuse**, on the south-east coast, was the ancient capital of the island.

725. FOREIGN POSSESSIONS. Italy claims the south-west coast of the Red Sea, and Eastern Africa from the Juba River to beyond Cape Guardafui. Little has been done, however, to develop these possessions. The Red Sea port of **Massowa** is in Italian territory.

726. MALTA is a small island to the south of Sicily. It was granted by Charles V. to the Knights of St. John in 1552, by whom it was ceded to the French in 1798. The British took it in 1800. The area of the island is 118 square miles, and the population is 182,000. The inhabitants are partly of Semitic origin, and use a patois, which is a mixture of Italian and Arabic. The Governor is appointed by the Crown and is assisted by two Councils. **Valetta**, the chief town, has a fine harbour, and is strongly fortified. It is the headquarters of the British Mediterranean Fleet.

THE IBERIAN PENINSULA.

727. THE IBERIAN PENINSULA derives its name from its ancient inhabitants, the *Iberians*. It is the most westerly part of the continent of Europe, and the nearest to Africa. It is also the largest of the southern peninsulas, covering an area of about 230,000 square miles, of which four-fifths are included in Spain, and one-fifth in Portugal. The Pyrenees divide it from France in the north. West of the Pyrenees the Bay of Biscay forms the northern boundary. The Atlantic bounds the peninsula on the west and south-west, and the Mediterranean on the east and south-east. At its southern extremity the Straits of Gibraltar, only 13 miles wide, separate it from Africa. Although the peninsula is almost surrounded by the sea it has few bays or good harbours. Few of the rivers are navigable for large craft even at their mouths, for most of them have rocky rapids or flow through narrow gorges near their mouths.

728. Surface. The **Pyrenees**, which stretch from Cape Creux on the east coast to the Bay of Biscay, are steep and rugged on the French side, but on the south descend in terraces towards the valley of the **Ebro**. Their central section is the most rugged, and contains the highest peak, **Mount Maladetta**, 11,168 feet. The passes that cross the range have no good roads, hence the traffic between France and Spain is carried on by roads near the coasts. The **Cantabrian Mountains**, of lower elevation, continue the Pyrenees westward, running parallel with the coast of the Bay of Biscay to **Cape Finisterre**. They spread out in the north-west corner of the peninsula forming the **Galician Highlands** and the numerous fjord-like bays which break the coast line. The **Sierra Nevada** (Snow Mountains), which stretch along the south-east coast of Spain from the Rock of Gibraltar to Cape de la Nao, contain the highest mountain in Europe outside the Alps, the **Mulahacen**, 11,420 feet.

729. The interior of the peninsula consists of an elevated plateau with an average height of 2,200 feet. In the north it extends to the valley of the Ebro, and in the south to that of the Guadalquivir; in the east its steep face reaches almost to the Mediterranean, and in the west it gradually slopes to the

Atlantic, broken by the rocky valleys of the Minho, Douro, and Tagus. The plateau is divided by numerous ranges of hills. The **Iberian Border Range** runs south-west of the Ebro. The **Sierra Morena** forms the southern boundary of the plateau, and the **Castile Mountains**, which divide the basins of the Douro and Tagus, and stretch south-westward to Cape Roca, divide it into Old Castile in the north and New Castile in the south.

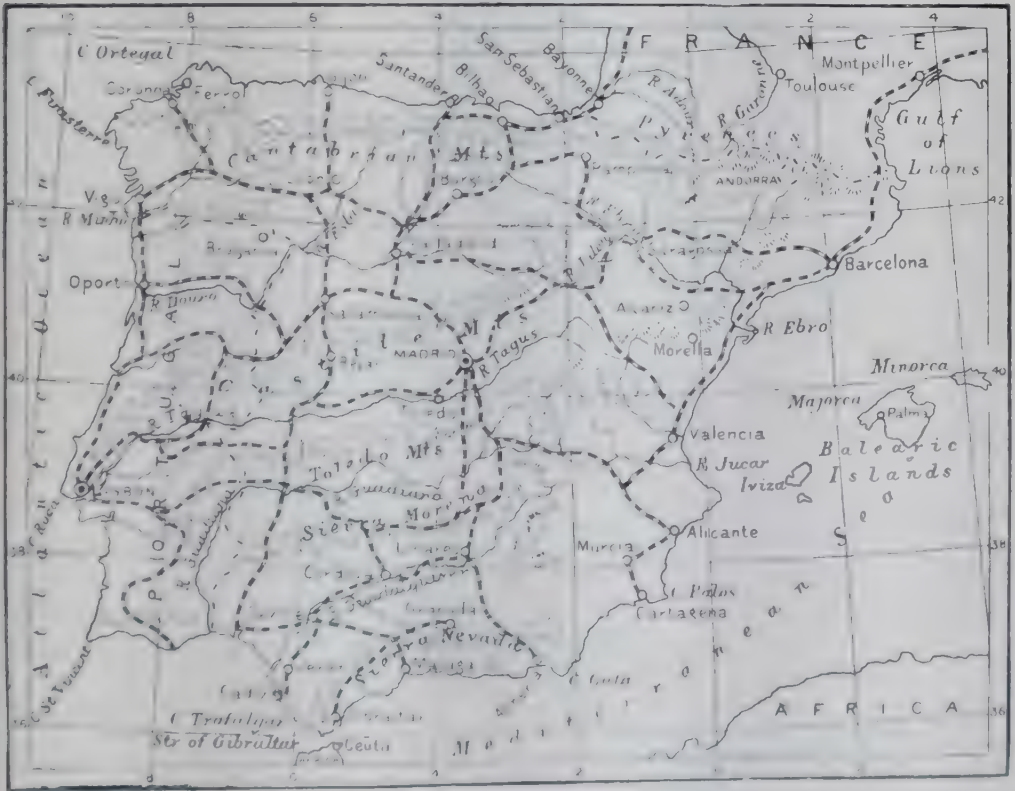


Fig. 137. Spain and Portugal.

730. Rivers. Of all the large rivers of the Iberian Peninsula only the **Ebro** flows into the Mediterranean. It rises in the Cantabrian Mountains and flows south-eastwards through the narrow plain of Aragon. Near its mouth it forces its way through a narrow gorge in the hills that obstruct its course, and then forms a delta. The **Guadalquivir** is the most important river of the peninsula for coming from the high mountains of Andalusia it brings down a large volume of water both sum-

mer and winter, and is navigable for steamers as far as Seville. The **Guadiana**, **Tagus** and **Douro** have their sources in the central plateau, which is not rich in water, and in summer they are often quite dry.

731. Climate and Natural Products. From its position in the south of Europe, between the Atlantic and the Mediterranean, the Iberian Peninsula might be expected to enjoy a particularly mild climate, and to produce most of the sub-tropical vegetation of other Mediterranean countries. But the surrounding mountain ranges keep off the moist sea winds, hence the plateau is dry both summer and winter, and the range of temperature is great. It contains large districts where nothing will grow, and others that yield only pasturage for sheep and goats. The fertile tracts are, therefore, mainly confined to the coastal plains, and the river valleys. The **vine** is extensively cultivated, especially in the west, and much **wine** is made and exported. Oporto gives it name to **Port Wine**. **Wheat**, **maize**, and **rye** are grown, but the country does not produce a sufficient quantity of cereals for its own use. **Onions** are largely raised for export, as also are **oranges**, **olives**, **nuts** and **raisins**. On the south and south-east coasts artificial irrigation has long been practised in well-cultivated districts called *huertas*, where many tropical plants flourish, and **dates**, **figs** and **sugar-cane** are grown. There are valuable **cork** forests on the mountain slopes, from which more than half the cork of the world is derived. The **silk-worm** is reared in many places, and large flocks of **sheep** and **goats** on the plateaux. The **Merino** sheep produces wool of high value. The fisheries are valuable, and on the coasts of Portugal the tinning of **sardines** for export is an important industry. Sardines are commonly preserved in olive oil, which the olive-gardens of the country yield in abundance.

732. The peninsula is rich in minerals. Much excellent **iron-ore** is exported from the Basque provinces on the Bay of Biscay. In ancient times the Spanish **silver** mines were famous, but little is now obtained. **Copper**, **lead**, and **quick-silver** are produced in large quantities and form a great part of the export. The minerals are exported as ores, for though good coal beds exist in Spain they are not worked sufficiently to yield what is required for smelting and manufacturing purposes. A large quantity of copper ore is shipped to South

Wales, especially to the town of Swansea where copper-smelting is an important industry.

733. Manufactures and Commerce. The most important manufacture is that of wine. Oporto in Portugal, and Seville and Jerez in Spain, are the principal sources of port and sherry, and Malaga, east of Gibraltar, exports a wine known by the same name. Silk and cottons are manufactured to a small extent. Cordova is famous for its leather. Paper is made in Barcelona, and corks are cut in the south. The greater part of the commerce of both countries is with Great Britain and France. The chief **exports** are wine, lead, iron and copper ores, fruit, cork, and olive oil. The principal **imports** are coal, cotton, timber, and machinery, tobacco and cigars.

SPAIN

734. The **KINGDOM OF SPAIN**, including the Balearic Islands in the Mediterranean, the Canary Islands off the west coast of Africa, and various possessions on the west and north coasts of Africa, covers over 198,000 square miles with a population of nearly 19 millions. Spain is a **limited monarchy**, and the legislative power of the State is exercised by the **Cortes**, the parliament of Spain. The country is divided into 49 provinces. Formerly it was composed of various kingdoms of which **Aragon, Castile, Andalusia, and Navarre** were famous in history. Spain had once a great colonial empire, of which the only remnants left to her are **Rio de Oro** in West Africa, a barren tract extending along the coast for 500 miles north of Cape Blanco and about 250 miles inland, and a few small islands, the most important of which is **Fernando Po** in the angle of the Gulf of Guinea.

735. People. The people of Spain are of very mixed descent, the country having been successively invaded by representatives of all the great Aryan races of Europe save the Slavs, and by the Moors of North Africa, all of whom settled in the land and mingled their blood in varying degrees. To this is to be ascribed the striking difference between the inhabitants of the different provinces, as well as the racial jealousies that still prevail. The **Iberians**, an Asiatic non-Aryan race, were probably the earliest inhabitants. The **Basques**, a race found along the north coast, are their descendants. **Celts and Gauls**

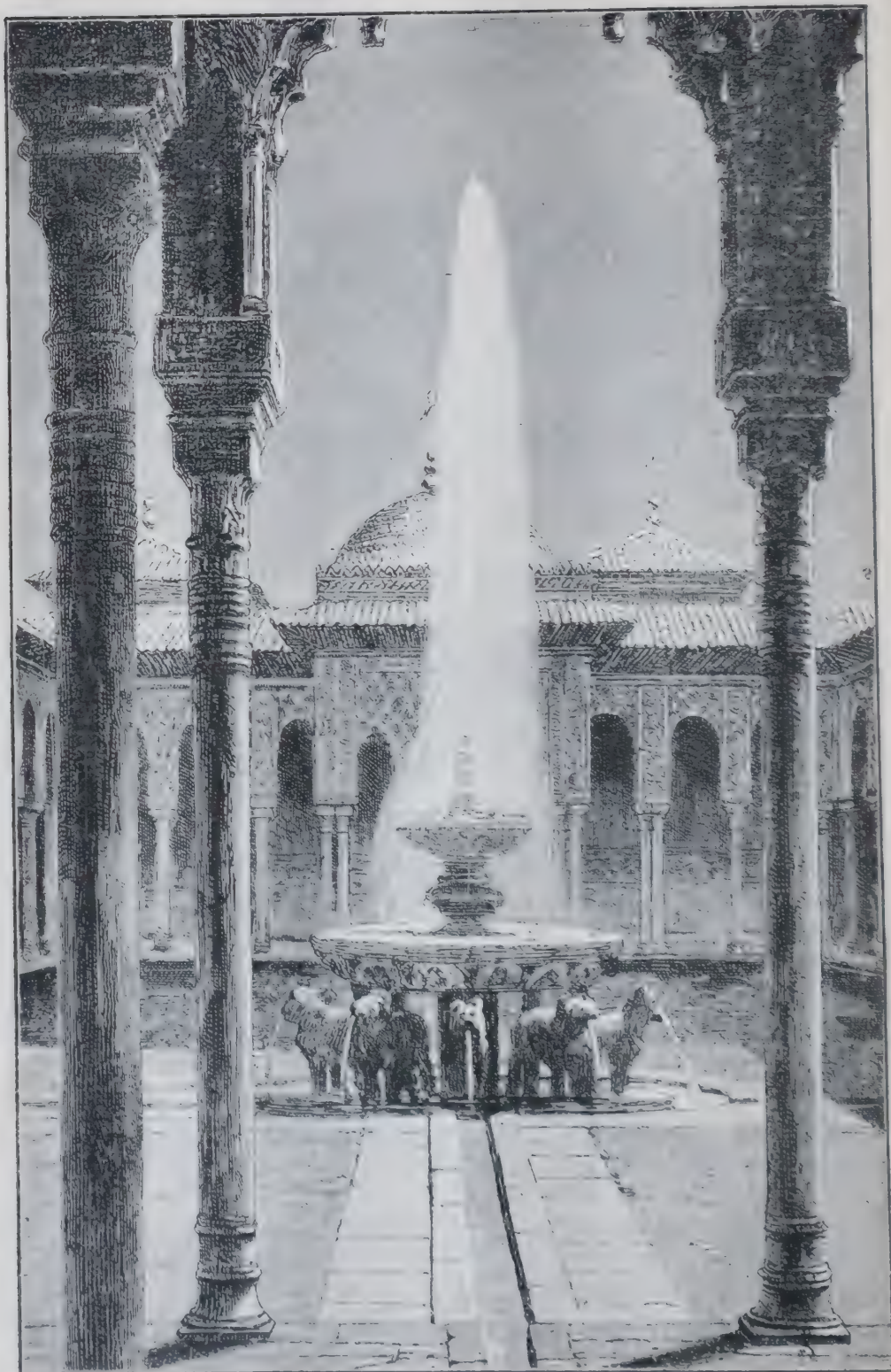


Fig. 138. A Court of the Alhambra.

were the next settlers. The country was successively conquered by the **Romans**, **Visigoths**, and **Moors**, and at times was divided into several kingdoms. The Moors held the greater part of the peninsula for seven centuries. Aragon and Castile were united by the marriage of their sovereigns Ferdinand and Isabella, under whom the Moors were expelled in 1491. The Spanish language, which is very sonorous, belongs to the Latin family. Roman Catholicism is the state-religion. Education is compulsory, but as the education laws are not rigidly enforced the majority of the people are still unable to read and write.

736. Chief Towns. **MADRID** (540,000), the capital, is in the central tableland, on the Manzanares a tributary of the Tagus. Beyond being the seat of government and of a university, it is of little moment. **Toledo**, the ancient Visigothic capital, on the Tagus, used to be famous for its sword-blades. It is now a decayed town, but has one of the most exquisite cathedrals in the world. **Corunna** is a commercial and fortified seaport in the north-west corner of the peninsula, off which a great battle was fought in 1809 between the English and French. Near Corunna is **Ferrol**, an important naval station. **Santander**, **Bilbao**, and **San Sebastian** on the north coast, are the chief ports for the export of iron. **Barcelona** (533,000), the second city in the empire, is the most important manufacturing and commercial centre. **Valencia**, on the bay of the same name, is the centre of the silk manufacture.

737. Granada, the capital of the ancient Moorish empire, is the most beautiful city in Spain. Near it is the Alhambra, the once splendid palace of the Moorish kings. **Gibraltar**, the famed rock-fortress, and the key of the Mediterranean, belongs to Britain. **Cadiz**, on the south-west coast, is a naval port. **Cordova**, once the most important town of the Moorish empire, is famous for its cathedral which was once a mosque.

738. The BALEARIC ISLANDS include **Majorca**, the largest, **Minorca**, **Iviza** and many smaller ones. **Palma**, the capital, on Majorca, is a beautiful town. The **CANARY ISLANDS** on the west coast of Africa cover an area of over 2,800 square miles, and have over 350,000 inhabitants. They are volcanic islands of which the principal are **Grand Canary**, and **Teneriffe** with the Peak of Teneriffe, 12,182 feet high. **Las Palmas** in Grand Canary and **Santa Cruz** in Teneriffe are the principal seaports. The islands export wine, maize, tobacco, wheat, sugar, bananas and vegetables.

739. ANDORRA, a small peasant republic in the eastern Pyrenees, is an independent State. It is under 200 square miles in extent, and has less than 10,000 inhabitants.

PORTUGAL

740. The **KINGDOM OF PORTUGAL** includes the west and south-west of the peninsula, and has an area of over 35,000 square miles, and a population of over $5\frac{1}{2}$ millions. The Portuguese are of mixed descent, and resemble the Spaniards in language and customs, though a strong mutual dislike exists between the two nations. In early times Portugal formed part of Spain, but became a separate kingdom in 1139 A.D. In the fifteenth century it was distinguished for its maritime enterprise, and had a rich commerce, and vast colonies. It was subjugated by Philip II. of Spain in 1580, but recovered its independence in 1640. The Government is a **limited monarchy**. The parliament is called the **Cortes**.

741. Towns. **LISBON** (356,000), the capital, is near the mouth of the Tagus and has considerable commerce. **Oporto** (173,000), near the mouth of the Douro, is the second city in the kingdom, and has an extensive wine trade. It gives its name to the country, as well as to the port wine which it exports. **Setubal**, in the south, is a seaport, with fisheries and a large manufacture of salt. **Coimbra**, towards the centre, has the only university in the kingdom. **Sines**, in the south-east, was the birthplace of Vasco da Gama.

742. Foreign Possessions. The **Azores**, **Madeiras**, and **Cape Verde Islands** in the Atlantic; **Angola**, the **Guinea Territory**, and **Mozambique** in Africa; **Goa** and some other settlements in India; **Timor**, an island in the Malay Archipelago, and **Macao** in China. The Azores are noted for their oranges, called St. Michael's after the largest island. The colonies are estimated to contain 800,000 square miles, with a population of 9 millions; but the control exercised over large tracts of Africa is merely nominal. The Portuguese first explored the route to India by the Cape of Good Hope, and they held Brazil till 1825.

AFRICA

GENERAL VIEW

743. AFRICA is the south-western portion of the Old World, and forms an immense peninsula joined to Asia by the low sandy **Isthmus of Suez**, 73 miles in width. Next to Asia, Africa is the largest continent, being about three times the size of Europe. Its greatest length from north to south is almost exactly 5,000 miles, and its greatest breadth from east to west is but little short of this. It is a compact mass with few indentations. For its immense area its coast line is exceedingly short. It contrasts sharply with other continents of the Old World in not being split up into peninsulas. In shape it resembles South America, except that throughout it is greater in width, and its southern arm is more rounded.

744. In middle geological ages Africa was joined to Europe by what is now the Straits of Gibraltar, and the northern part of the continent is still European in climate and flora. The Atlas Mountains, which traverse the north of Africa from Morocco to the N.E. corner of Tunis, dip below the Mediterranean and re-appear in the range of fold-mountains which run along the south of Asia Minor and right through Asia to Burma. North Africa is thus structurally connected with Eurasia. Geology further teaches us that at one time South Africa was connected with India by the now submerged **Gondwanaland**. In all probability, also, a large inland sea opening into the Atlantic, and which now forms the basins of Lake Chad and the Congo, divided the northern and southern parts of the continent in the west. Whether this were so or not, it is true that there is to-day the strongest possible contrast between Africa north of the Sahara and Africa south of it. The latter forms the characteristic region of Ethiopia while the former is little separated in character from southern Europe. The two regions differ widely in the races which inhabit them, as well as in their fauna and flora.

745. Coast-line. Beginning at the extreme eastern point of the north coast we have first, for more than a couple of hundred miles, the low delta of the Nile, and then for over 600 miles a stretch of low coast, first sandy and then rocky, and ending in the rounded promontory of **Barca**. From this point the coast-line runs southwards for 200 miles, then west-north-west for about 500, and then almost due north again to **Cape Bon** in latitude 10°N. , the most northerly point of the continent. The two gulfs between these projecting points, the **Gulf of Sidra** on the east and that of **Gabes** on the west, were known to the ancients as the **Greater** and **Lesser Syrtes**. From Cape Bon the coast continues rocky until about 500 miles beyond **Ceuta**, which faces Gibraltar, then for 1,000 miles, almost to the river **Senegal**, it is again a low, sandy, barren stretch with little to break its outline. From the Nile right round to the Senegal there is not a single river of any moment. From **Cape Verde**, a little south of the Senegal, and the most westerly point of the continent, the coast curves round gradually to **Cape Palmas**, south of Liberia, from which point it runs eastward to the **Cameroons** where it again turns to the south. The whole of this part of the coast, which includes the projecting delta of the **Niger**, is low and marshy and covered with dense tropical vegetation. It is the most unhealthy part of the world.

746. The arm of the sea enclosed by the bend of the coast is known as the **Gulf of Guinea**. Just at the bend the rocky island of **Fernando Po**, which belongs to Spain, rises abruptly at a little distance from the shore. From that point the coast runs in a southerly direction to the **Cape of Good Hope**, a distance of nearly three thousand miles. Throughout this entire length there is no good harbour save **Walfish Bay**, and only two great rivers, the **Congo** and the **Orange**, break the monotony of the coast-line. For the most part terraced mountains, of no great height, rise almost from the water, so that there is hardly any coastal plain. The eastern coast running up from the Cape of Good Hope and **Cape Agulhas** to **Cape Guardafui**, the most easterly point of the continent, is in many respects similar to the west coast. But the mountains that flank it are higher, and in the northern half recede much further from the sea. It is curved and regular, with few small indentations, and there are not many good natural harbours

save **Delagoa Bay** in Portuguese territory, **Dar-es-Salaam** in German, and **Mombasa** in British East Africa. **Durban** in Natal, and **Port Elizabeth** in Cape Colony, though growing seaports, have little natural protection. Round Cape Guardafui, through the **Straits of Bab-el-Mandeb**, and along the western shore of the Red Sea, the same conditions are maintained, except that the coasts are more rocky and precipitous.

747. **Surface.** Though Africa does not contain any mountains which rival in height the great peaks of Asia, it approaches very near to that continent in average elevation. The greater part of the continent consists of table-lands, those in the northern half having an average elevation of about 1,500 feet, and those in the southern half of 3,500 feet. There are few prominent mountain chains. Taking the continent as a whole it is the oldest of the great land-masses of the world, and consists largely of ancient crystalline rocks, with a much smaller proportion of sedimentary rocks than usual. The chief mountains are, therefore, *massed* rather than *folded*, and the plateaux owe their present elevation to the subsidence of surrounding tracts, and have not been thrust up by lateral pressure. Along the north-west of the continent runs, as we have seen, the **Atlas Mountains**, forming the western extremity of the great Old World fold-systems. Their average elevation for over 1,000 miles is about 8,000 feet, but one peak, **Mount Mitsin**, in Morocco, lifts its head to a height of over 11,000 feet. Right across the northern half of the continent stretches the low plateau of the **Sahara**, which is for the most part a sandy desert.

748. Three ridges of greater elevation stretch north and west into the desert region from a latitude of about 10°N. In the east of the continent, a little to the west of the Gulf of Aden, is the high **Abyssinian Plateau** with an average elevation of 7,000 feet, and mountains which rise from 4,000 to 6,000 feet above the level of the plateau itself. From this as a centre a line of elevation stretches almost parallel to the Red Sea, bounding the Nile basin on the east. The elevation gradually declines to the north until it sinks to the level of the plains. West of the Abyssinian Mountains the elevation gradually drops to about 1,500 feet, forming a broad, sandy plain through which the White Nile flows. Towards the middle of the

continent the level rises again and a broad tongue of higher land extends in a north-westerly direction towards the Atlas Mountains, but sinks to the level of the plateau 200 miles before the southern slopes of those hills are reached. In the south-east this line of elevation continues, dividing the basin of the



Fig. 139. Africa in relief.

Nile from the basins of Lake Chad and the Congo, until finally it merges in the highlands around the great lakes. On the western side of the continent a range of highlands stretches northwards from near the mouth of the river Congo to the

Cameroon Mountains near the angle of the Gulf of Guinea. It then divides, one arm stretching north-east and separating the Chad basin from that of the Niger, and the other running westward almost to Cape Verde, and forming the southern and western boundaries of the Niger basin.

749. In the south of the continent the levels are everywhere higher. From the Abyssinian Mountains a broad belt of broken mountainous country stretches almost to the southern point of the continent. Through the heart of this long stretch of highlands is the **Great Rift Valley**, a vast cleavage in the crystalline rocks of which the mountains are composed. This rift is one of the most remarkable features in the configuration of the continent. It can be traced northwards almost to the mountains of Abyssinia, up the Red

Sea and the Gulf of Akaba and along the Jordan valley to the Sea of Galilee. It is on the line of this rift—called "**The Dead Sea Rift**"—that most of the great lakes of Africa occur.

750. Along the whole line of the east African highlands vast areas of igneous rock indicate ancient volcanic activity. The highest mountains on the continent are near the great lakes **Kilima Njaro** 200 miles west of Mombasa **Mount**



Fig. 140. The dotted portion shows the Great Rift Valley.

Kenya a little further north, and **Ruwenzori** south of Lake Albert. They are all volcanic peaks and rise to a height of between 18,000 and 19,000 feet.

751. South and west of this region the whole of the continent maintains a fairly high level, sloping gently to the west. The **Drakenberg** mountains run southward from the Zambezi at a little distance from the sea; and from their southern point, the **Nieuwveld Range** runs east and west through Cape Colony. Along the west coast the plateau rises from the sea in a series of scarped terraces to heights of from 3,000 to 5,000 feet.

752. **Drainage.** The chief drainage of Africa is westward to the Atlantic basin. The **Nile** issues from **Lake Albert**, which receives its waters from the larger **Victoria Nyanza**. Flowing almost due north it receives, about Lat. 10°N ., the waters of the **Bahr-el-Ghazal** from the west, and further north the **Blue Nile** and the **Atbara**, both from the Abyssinian Mountains. The river then takes a winding northerly course through Nubia, descending the terraced edge of the plateau by a series of cataracts which greatly impede navigation. At Cairo its delta begins. Owing to the heavy summer rains of northern equatorial Africa the Nile is in flood in the autumn. It brings down large quantities of mud which it deposits as an enriching layer over broad strips of alluvial land along its course. Vast engineering works have recently been carried out whereby the waters of the Nile are permanently confined to a higher level and made available for purposes of irrigation.

753. Round the north and west coasts of the continent there is no other great river until we come to the **Niger**, which rises in the Kong Mountains north of Liberia and flows first in a north-easterly direction to Timbuctoo, and then turning south-east makes its way to the Gulf of Guinea. Its delta separates the **Bight of Benin** from the **Bight of Biafra**. The only important tributary of the Niger is the **Binué** from the east, which drains the northern slopes of the Cameroon Mountains. West of the Niger is the inland basin of **Lake Chad**, a large but shallow lake, which receives the drainage of a vast depression between the basins of the Nile and the Niger. Lake Chad varies greatly in size according to the season, and when in flood its surplus water drains to the north-east along the channel of the **Bahr-el-Ghazal**.

754. The **Congo** and its tributaries drain the western slopes of the eastern mountain system and several of the great lakes. The Congo itself issues from **Lake Bangweola**, a shallow lake 300 miles west of Lake Nyassa, and flows almost in a northerly direction to the equator. Just north of the equator are the **Stanley Falls**, a series of cataracts by which the river descends into the lower portion of its basin, once an inland sea. It then takes a semi-circular course, crossing the equator again almost 10° further west, where it receives the waters of its great northern tributary, the **Ubangi**. Five hundred miles further on it spreads out into the **Stanley Pool**, on the shores of which stands the town of *Leopoldville*, now a railway terminus. Two hundred miles further on the river makes its descent from the plateau by the **Livingstone Falls**, and soon afterwards enters its broad estuary. The Congo drains an area of heavy rainfall, and discharges a greater volume of water into the sea than any other river in the world save the Amazon. It is only navigable, however, for a very short distance from its mouth, as the Livingstone Falls are within 200 miles of the sea.

755. In the south of the continent the **Orange River** with its tributary the **Vaal** takes the drainage of the Drakenberg and Nieuwveld mountains across to the west coast, where it pours its waters into the Atlantic 28° south of the equator. Between the basins of the Congo and the Orange rivers, both of which slope to the west, the Zambezi basin, sloping to the east, stretches far across the continent. The **Zambezi**, like several of its tributaries, rises in the Dutch Province of Angola and flows at first in a south-easterly direction. Almost midway between the eastern and western coasts of the continent it bends round, and, taking a north-easterly course, describes a vast semi-circle to the Mozambique Channel. Just at its bend occur the magnificent falls discovered by Livingstone and named by him the **Victoria Falls**. The river above the falls is a mile wide and has an average depth of 50 feet. It plunges into a chasm 450 feet deep, from which the only exit is a narrow zig-zag gorge which it has cut in the hard crystalline rock, and along which the immense volume of water roars with terrific fury. In this respect there is nothing to equal the Victoria Falls in the known world. A hundred miles from the sea the Zambezi is joined by the **Shiré River** which brings the drainage

of **Lake Nyassa**, and a little further down it breaks up into the numerous channels of its delta. The **Zambezi** is navigable for about 300 miles from its mouth.

756. The Great Lakes. The lake system of eastern Africa is of unusual interest. The lakes are of two kinds; those situated in the rift valleys are deep and narrow, and some of them of great length; while those on the surface of the plateaux are broad and shallow. **Nyassa, Tanganyika, Albert Nyanza, and Rudolf** are of the former type, and **Bangweola, Moero, the great Victoria Nyanza, and Tsana** in Abyssinia, are of the latter. In the south two main lines of rift can be traced, converging at Lake Rudolf. The almost precipitous walls are from 25 to 200 miles apart, and between them is a deep depressed valley. The main rift runs, with hardly a break, through about 50° of latitude. It encloses the Red Sea, and further south its great western wall forms the southern boundary of Abyssinia. (See map on page 329.)

757. The story of the exploration of these mighty rivers and lakes, and of the trackless forests which surround them, forms a fascinating record of adventure and daring. The travels of **Bruce, Livingstone, Burton, Speke, Baker, Stanley**, and many others, have made the heart of Africa no longer the unknown land it used to be, and have opened it to civilization and commerce. Burton and Speke were both Indian officers. The former discovered Tanganyika, and the latter Victoria Nyanza in 1858. Livingstone died at Lake Bangweola in 1873.

758. Climate. Africa extends almost as far to the south of the equator as to the north, and about nine-tenths of its surface lies within the tropics. The mass of land is so great that the climate, as a whole, is strongly *continental* in character. There are two desert areas having their centres, roughly speaking, on the northern and southern tropics. The northern desert, the great **Sahara**, is the western part of an almost rainless belt which stretches from West Africa to the Desert of Gobi in China. The southern, called the **Kalahari Desert**, lies between the basins of the Orange River and the Zambezi. It is easy to understand why these two areas are almost rainless. In North Africa the winds for 10 months of the year are from the north-east, and in South-west Africa from the south-west. In each case these are the normal winds of the latitude, and as both blow from colder to warmer regions

their vapour-bearing power is increased as they travel over the land. There are no mountains of any consequence to drive them upwards to colder altitudes.

759. These dry areas influence the climate and rainfall of some parts of Africa precisely as the dry areas of Central Asia influence the climate of India. When the sun comes north the

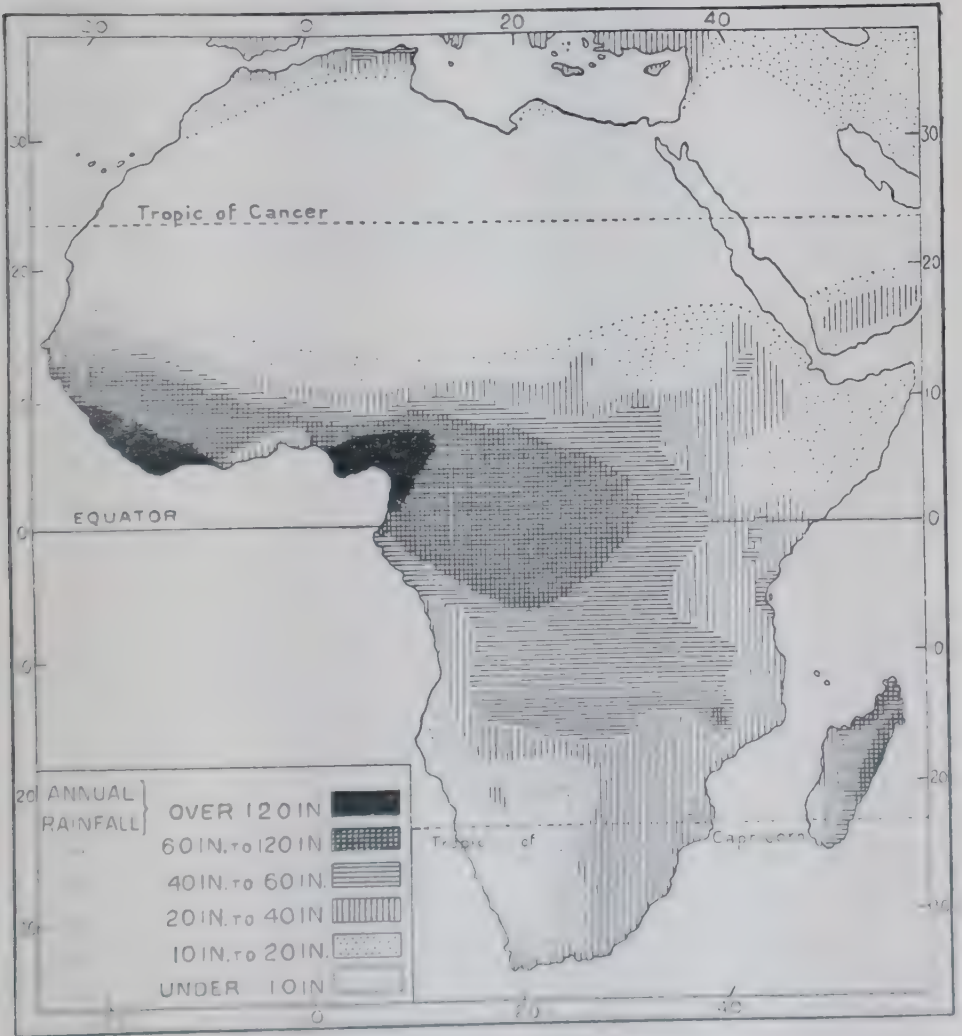


Fig. 141. Average Annual Rainfall of Africa.

great heat of the Sahara draws the winds in from every side, and as those blowing from the tropical oceans are warm and moisture-laden, that part of the continent lying immediately north and east of the Gulf of Guinea, as well as portions of the eastern coast, receive at that season exceedingly heavy

rains. As the sun passes south again the Kalahari Desert produces the same effect upon the climate of South Africa, and causes a heavy fall of rain along the south-east coast. In the tropical parts of the continent the rains thus *follow the sun*. The northern tropical regions receive their heaviest fall in July, and the southern tropical regions in January.

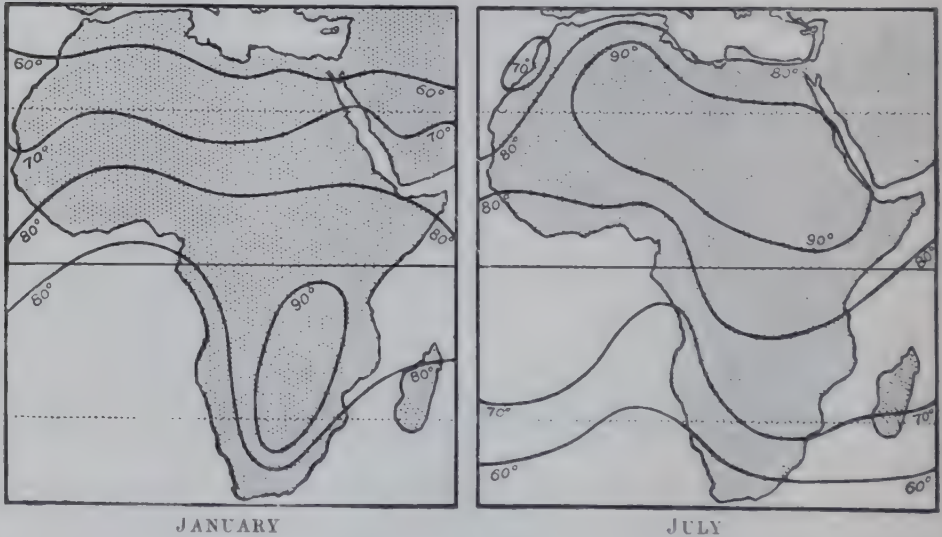


Fig. 142. The Summer and Winter Isotherms.

760. Vegetation. *Wheat, dourra, and barley* are the chief grains of the north. *Oranges, olives, the cotton plant, and the date-palm* likewise abound. In Central Africa there are immense *forests*. In the west *maize, rice, the cassava, yams, plantains, sugar, and palm-oil* are the chief vegetable products. The east is the native region of the *coffee plant*. Southern Africa is noted for its beautiful *heaths*. The *vine, and cotton* are now extensively cultivated in Cape Colony and Natal. Western Africa is noted for its *gum trees*, and for the gigantic *baobab, or monkey-bread tree*. The latter is not of very great height but is sometimes thirty feet in diameter. Its fruit is extensively used as food. The jungle grass of Guinea sometimes attains a height of fourteen feet, so that elephants may browse in it unseen. East Africa is distinguished for its numerous *palms* and aromatic trees. Many of the plants of South Africa have slender wiry roots and thick fleshy leaves, which shows that they derive most of their moisture from the air.

761. Minerals. *Gold* is found in the sands of many of the large rivers in Central Africa, and vast quantities are obtained from the mines of the Transvaal, where it is found embedded in the quartz. *Diamonds* of excellent quality are found in the blue clay at Kimberley in Cape Colony, and the De Beers diamond mines are the most famous in the world. *Salt* is abundant in several parts of the continent.

762. Animals. The *camel*, *ox*, *sheep*, and *horse* are the principal domestic animals, but in many parts of South Africa the *tse-tse fly* is found, whose bite is fatal to horses. The *giraffe*, *hippopotamus* or river-horse, and the *zebra*, are peculiar to this continent. The *gorilla*, *lion*, *leopard*, *elephant*, *rhinoceros*, and *ostrich* are found in the jungles and deserts, and *crocodiles* are numerous in many of the rivers. Clouds of *locusts* sometimes lay waste large tracts. *Termites*, or white ants, swarm along the coasts of Guinea.

763. People. The population of Africa is very uncertain, but it is variously estimated at from 150 to 200 millions. The continent is chiefly inhabited by four great races—**Hamites** in the north and north-west, **Semites** in the north-east, **Negroes** south of the Sahara, and **Bantus** in the great southern table-land. The two first of these belong to the *Caucasian* family and the two last to the *Ethiopic*. The Hamites are darker in complexion than the Semites, but they have not the woolly hair nor thick lips of the Negroes. The Hamites and Semites are mostly Muhammadans, but some ancient Christian sects survive among the Semites of Abyssinia and Egypt. The **Negroes** inhabit chiefly the centre of the continent. Large numbers of them have in the past been reduced to slavery. The slave trade has long been the curse of Africa, and, although Britain and other Powers have done their utmost to suppress it, still exists to some extent. Polygamy is universal among the Negroes, and most of them are sunk in the grossest idolatry. Muhammadanism is spreading amongst them, and a few have embraced Christianity. The **Bantus** in the south are a brown race, many of whom are tall and athletic and make good soldiers. The **Kaffirs** and **Zulus** are two of the best known tribes. Fetishism prevails among them, but Christianity is making progress. The **Hottentots** and **Bushmen** are primitive races found in the south-west, who seem to have much in common with the Bushmen of

Australia. The **Akkas**, found in the heart of the continent, are only about four feet in stature.

764. Political Divisions. Almost the whole continent is now under the dominion of one or other of the European Powers. The following table gives the most recent statistics.

States.	Area in square miles.	Population.
EGYPT AND ANGLO-EGYPTIAN		
SUDAN	1,135,000	22,000,000
BRITISH POSSESSIONS	2,165,000	21,870,000
FRENCH .. (including Madagascar)	3,712,000	18,825,000
GERMAN	905,000	8,500,000
BELGIAN .. (Congo Free State)	900,000	30,000,000
ITALIAN	230,000	500,000
PORTUGUESE	790,000	3,600,000
SPANISH	82,000	330,000
TURKISH	340,000	1,300,000
Independent States :—		
ABYSSINIA	320,000	4,000,000
MOROCCO	180,000	8,000,000
LIBERIA	52,000	1,000,000



Fig. 143. A Scene on the Nile, with the Pyramids in the distance.

EGYPT

765. **Egypt** forms the north-eastern extremity of Africa. It is bounded on the south by Nubia, now part of Anglo-Egyptian Sudan, and on the west by the Great Desert. The area is about 400,000 square miles, but much of it is desert. the cultivated area measuring only about 13,000 square miles.

766. **Surface and Climate.** Egypt includes the lower valley and delta of the Nile. The valley of the Nile is long and narrow, formed by two ranges of hills which are, on an average, about six miles apart. In some places these hills rise to a height of 2,000 ft.; in others they are merely slight elevations. On the west of the Nile valley is the **Libyan Desert**, a rocky plateau from 600 to 1000 ft. high, in which a number of deep depressions occur which form fertile oases. Further to the south-west is the sandy waste of the **Sahara**. On the east of the river is the **Red Sea Desert**, consisting of wastes of sand upon a limestone plateau, diversified by low ranges of hills running north and south. The Nile resembles the Indus in not receiving a single tributary in its lower course. Much water is drawn off for irrigation, hence the volume of the stream becomes smaller and smaller as it nears the sea. The climate of Egypt is very dry, rain being almost unknown in the north. Along the Nile Valley, however, there has been a distinct increase in the rainfall of recent years owing to the spread of cultivation which the conservancy of the Nile waters has made possible. The heat in summer is excessive, but during the rest of the year the temperature is mild and pleasant. The dews at night are very heavy.

767. **Productions and Commerce.** The districts watered by the Nile are exceedingly fertile; the rest of the country is comparatively barren. Large irrigation works have recently been completed which, in course of time, will probably double the area of cultivation. The chief productions are *millet*s, *wheat*, *sugar*, *cotton*, *indigo*, *tobacco*, *dates*, *onions*, and *cucumbers*. The foreign trade amounts to about 40 millions sterling, almost equally divided between exports and imports. Raw cotton, beans, wheat, and sugar are the principal **exports**; and the **imports** are cotton cloth, coal, and metals.

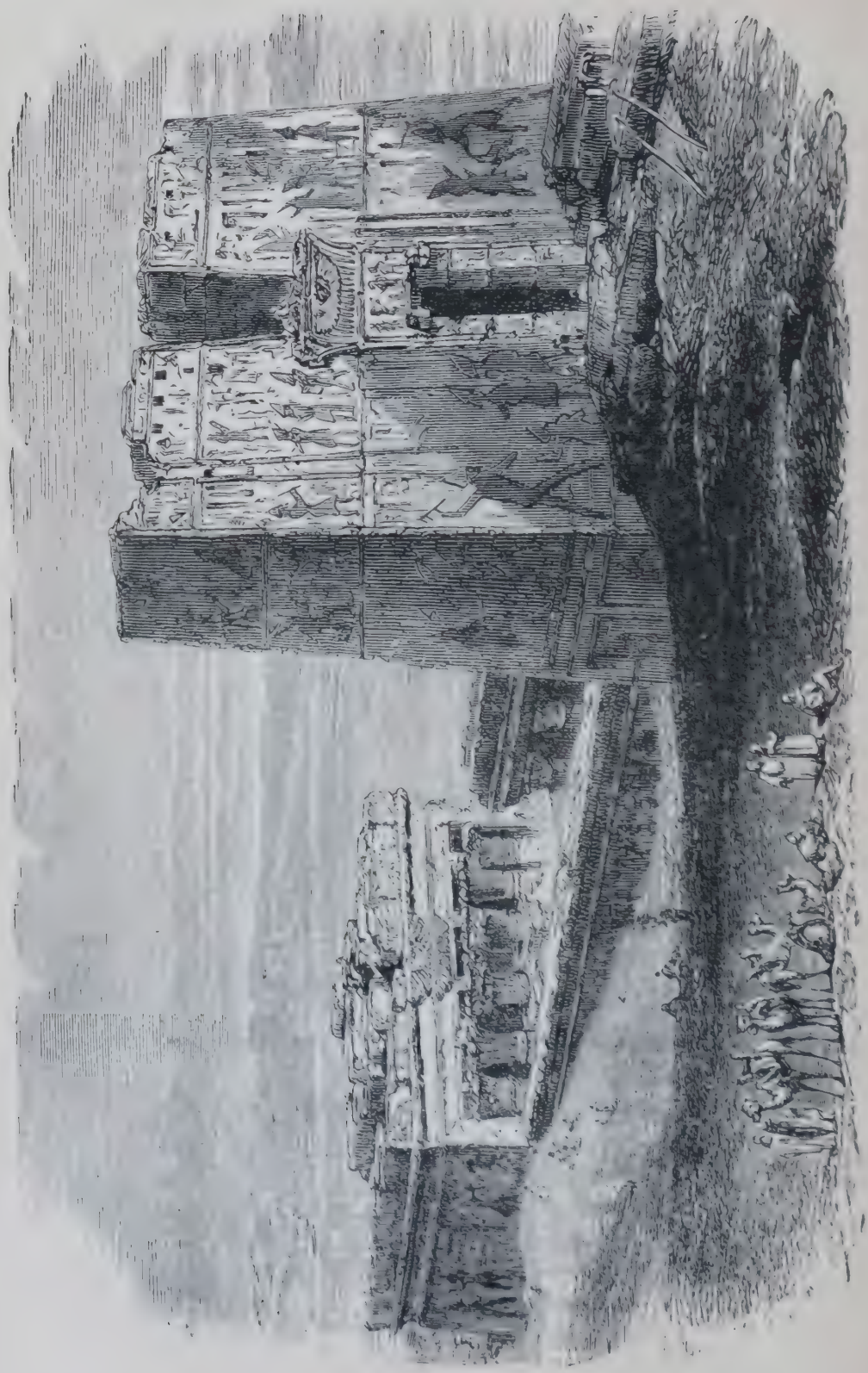


Fig. 144. An Ancient Egyptian Temple.

768. Government. The Government is nominally despotic under a ruler styled the **Khedive** who is tributary to the Sultān of Turkey. For more than twenty-five years, however, the country has been under British control, exercised through officers appointed to act as advisers to the Khedive, and has prospered greatly. Taxes have been reduced, forced labour abolished, and many other reforms carried out.

769. History. Under the Pharaohs Egypt attained considerable power, but in 525 B.C. it was conquered by Cambyses, a king of Persia. In 322 B.C. it submitted to Alexander the Great, and soon after his death was formed into a separate kingdom under Ptolemy, one of his generals, the first of the line of kings of that name. The last of this dynasty was Queen Cleopatra, who perished 30 B.C. when Egypt became a Roman Province. The next conquerors were the Saracens, under the Caliph Omar, by whom it was subjugated in the year 640 A.D. In 1517 A.D. it was subdued by the Turks, and tribute is still paid to the Sultān, though the government is now hereditary in the family of Mehemet Ali. Egypt is remarkable for its early civilization. Its immense pyramids, and ruins of magnificent temples, still bear witness to its former greatness. The pyramids, a few miles from Cairo, are perhaps the most astonishing monuments of human labour in existence. The largest is 480 feet high, and covers 13 acres. They are supposed to have been intended as tombs of the kings. The sphinx, near the pyramids, is a gigantic figure with a woman's head and a lion's body. Thebes, in Upper Egypt, was called "the city of a hundred gates." The stones of its temples are usually of immense size. Here and in other parts of the country extensive excavations have recently been made which have greatly increased our knowledge of early history.

770. Chief towns. **Cairo**, on the Nile, is the capital of Egypt, and the largest city in Africa. It was founded by the Arabs about 970 A.D. and the citadel was built by Saladin in 1176 A.D. Cairo is connected with Alexandria, Port Said, and Suez by rail, and a line now runs along the Nile valley into Upper Egypt. The city has many fine buildings and luxurious hotels, and is a great resort of tourists. The population is about 570,000.

771. Alexandria, on the Mediterranean, is the chief port, and possesses considerable trade. It was founded by Alexander the Great, and at one time was the second city in the Roman Empire. It is now connected with Suez and Cairo by railway. Population, 320,000. **Rosetta** and **Damietta** are small seaports at the mouths of the two principal branches of the Nile.

772. Suez, a seaport at the head of the western arm of the Red Sea, is connected by a canal 87 miles in length with **Port Said** on the Mediterranean. Almost all steamers trading between Europe and Asia pass through the Canal. **Siout**, on the Nile, is the chief town of Upper Egypt. **Assouan**, near the first cataract of the Nile, is noted for its granite quarries. **Wady Halfa**, on the Nile, at the second cataract, 800 miles from Cairo, is the most southerly town of Egypt proper. **Kosseir** and **Suakin** are seaports on the Red Sea. At the latter port great numbers of pilgrims embark for Mecca.

ANGLO-EGYPTIAN SUDAN

773. The Khedive of Egypt used to exercise a nominal authority over the whole valley of the Nile as far south as Lakes Albert and Victoria Nyanza, as well as over Darfur and some other districts in the west. A rebellion broke out in 1883 under a leader called the *Mahdi*, and all this territory was lost save Egypt proper. The power of the Khalifa (the Mahdi's successor) was completely broken by Lord Kitchener at the battle of **Omdurman**, in 1898. By a convention made between England and Egypt in 1899 the Egyptian Sudan was placed under a British Governor-General. Anglo-Egyptian Sudan includes **Nubia**, which lies to the south of Egypt, with **Kordofan** and **Bahr-el-Ghazal** still further south and **Darfur** to the west. It extends from Abyssinia on the east to Wadai and French Ubangi on the west.

774. With the exception of a narrow strip watered by the Nile, the country is chiefly composed of rocky and sandy deserts. The climate is dry and hot. There are small patches on which various *millet*s, *barley*, *cotton*, *tobacco*, and *indigo* are cultivated. Ivory tusks are collected and exported. The Nubians are a strong, industrious race, who were conquered by the Egyptians in 1820. Their language is Berber.

775. Towns. **Khartum**, at the junction of the White and Blue Niles, the principal town, is connected by rail and water with Cairo. Here General Gordon met his death in 1885, when trying to relieve the besieged Egyptian garrison. **Omdurman**, the capital of the late Mahdi, is near Khartum. **Sennaar**, on the Blue Nile, was formerly the capital of an independent kingdom, but is now much decayed. **Fashoda** is south on the White Nile.

ABYSSINIA

776. Abyssinia, a part of the ancient **Ethiopia**, lies south-east of Nubia and Sennaar. The area is estimated at 320,000 square miles. It consists chiefly of high tablelands traversed by rugged mountains. The elevation renders the climate cooler than that of Nubia, and the abundant rains cause the soil to be very productive. The highest plain is about 8,000 feet above the sea-level, and the loftiest peak is nearly 16,000 ft. The country contains the source of the Blue Nile, so called from the colour of the mud it brings down. *Wheat* and *millets* are the chief vegetable products. The principal **exports** are *ivory*, *gold*, and *coffee*.

777. People. The inhabitants, estimated at 4 millions, are **Semites**, and are in a low state of civilization. *Ethiopic*, the ancient language, is no longer the common vernacular, though dialects of it are spoken in the higher districts. The religion is a **corrupt form of Christianity**.

778. Abyssinia at one time formed a powerful kingdom, but it was afterwards divided into petty States, which were generally at war with one another. The largest of these were **Amhara** in the centre, **Tigre** in the north-east, and **Shoa** in the south-east. At present they are under one king, who calls himself **The Negus**, or King of Kings and Emperor of Ethiopia. Italy claimed a Protectorate over Abyssinia; but this was not acknowledged, and the Italian forces were severely defeated by the Emperor Menelik at the battle of **Adowa** in 1896.

779. Towns. No town in Abyssinia contains more than 8,000 inhabitants. **Adis-Abeba** is now the capital of the kingdom. **Axum** is a former capital of the Ethiopian Empire. **Magdala** was stormed by the English in 1868. **Gondar** and **Adowa** are centres of considerable trade. **Massowa**, the chief port on the coast, is held by Italy.

NORTH AFRICAN STATES

780. The four States which divide the northern coast of Africa west of Egypt, **TRIPOLI**, **TUNIS**, **ALGERIA** and **MOROCCO**, are sometimes called the *Barbary States*, a name derived from

the Berbers, who formed the bulk of the inhabitants before their conquest by the Saracens. These States have much in common, and in spite of the different political relations which now divide them may be treated together.

781. Surface and Climate. There are three regions. A strip of fertile land called the *Tell* extends along the coast, increasing in breadth towards the west. A central plateau, traversed by the Atlas Range, stretches nearly from the Atlantic to Cape Bon. In the south a sandy region slopes towards the Sahara. There are no large rivers. The eastern parts and those exposed to the sultry winds of the Sahara are very hot; but along the coast the climate is temperate. The rainfall is very meagre except along the north coast of Tunis and Morocco where it averages over 20 inches a year. Cape Bon has over 40 inches.

782. Productions. *Wheat, millets, barley, cotton, tobacco, dates, olives, oranges,* and other fruits, are cultivated. Dates are so abundant in the sandy region between the Atlas Mountains and the Sahara, that the district is called *Beled-el-Jerid*, the Land of Dates. The *horses* of North Africa are excellent, and the *sheep* have very fine wool. *Lions, hyenas,* and other wild animals, are numerous. *Copper, iron,* and *rock-salt* are abundant. *Coral* and *sponge* are obtained along the coasts. *Leather* made from skins of goats, and *carpets* are the principal manufactures. *Esparto grass*, from the eastern States, *grain*, and *olive oil*, are the chief **exports**; *cotton goods* the chief **imports**.

783. People. Arabs, called Moors, occupy the cities; Berbers, or Kabyles, the original inhabitants, and wandering Arabs, dwell in the mountains and plains. The Moors were formerly much addicted to piracy. **Arabic** is the common language.

784. TRIPOLI, including BARCA and FEZZAN, the largest but most thinly peopled of the Barbary States, is a province of the Turkish empire under a Pasha. The area is estimated at 400,000 square miles, and the population at 1,300,000. **Tripoli**, the capital, situated on the coast, is visited by the trading caravans from Central Africa. **Benghazi**, eastward on the coast, is the chief town in Barca. FEZZAN, to the south of Tripoli, is a large district with some scattered oases. The chief town is **Murzuk**.

785. TUNIS, the most northern, is the smallest of the Barbary States; but it is fertile, and possesses extensive trade. The area

is about 51,000 square miles, and the population about two millions. The country was governed by a Bey, under the Sultān of Turkey, but in 1831 the French invaded Tunis, and it is now a *French Protectorate*. Olive oil and cereals are the chief **exports**. **Tunis**, the capital, is a large commercial city on a lake which communicates with the Mediterranean.

786. **ALGERIA**, formerly under a Prince called the Dey, was conquered by the French in 1830. The area is about 185,000 square miles, and the population nearly five millions, of whom about 200,000 are Europeans, chiefly French. **Algiers**, the capital, situated on the Mediterranean, was long notorious for its piracies. The town has been greatly improved by the French. Artesian wells have been



Fig. 145. Tangier.

sunk in the desert, and railways have been constructed. The produce consists chiefly of *wheat, wine, barley, olives, silk*, and *esparto grass*; and the foreign trade is about £2,000,000. **Algiers** is one of the most important coaling stations in the Mediterranean.

787. **MOROCCO**, or **MAROCOCO**, is the most fertile and populous of the Barbary States. The Sultān calls himself "*the Prince of True Believers*." The area is about 219,000 square miles. The population is estimated at eight millions. The government is very despotic. *Leather* is the only manufacture of importance. **Morocco**, the capital, is an inland town. **Tangier** and **Mogadore**, on the west coast, are the principal seaports. **Fez**, north east of Morocco, is the seat of a Muslim university. **Ceuta**, opposite Gibraltar, belongs to Spain.



Fig. 146 Arab Traders in the Sahara. A halt in the Desert.

THE SAHARA

788. The SAHARA, or the Great Desert, lies south of the Barbary States, and extends from the Atlantic to Egypt. It is nearly twice the size of India, and forms a vast table-land averaging about 1,500 feet above the sea, and covered with gravel or loose sand. It contains several small mountain chains rising to 7,000 feet, and plateaux of from 3,000 to 4,000 feet. A lowland, with numerous salt lakes, stretches from the Gulf of Gabes to the south of Morocco. There are no rivers. During the colder months the winds blow outwards from the Sahara; during the hotter months, inwards. But these last have been robbed of their moisture before they reach the Sahara, and consequently extremely little rain falls. There are numerous **oases**, situated in depressions where spring water is available. These are covered with the most luxuriant vegetation, and abound in date-palms. In some of the oases the lion, leopard, jackal, giraffe and gazelle are found. Elsewhere both flora and fauna are very scanty.

789. A great part of the population of the Great Desert are Arab Moors. Caravans traverse the Sahara in different directions, halting at the oases. They bring the produce of the desert, *ivory, gold dust, dates and gums*, to the coast settlements where they are exchanged, chiefly for *textiles and fire-arms*. There are no towns. The northern tribes are mostly Berbers, the southern Negroes. The western half of the Sahara is now claimed by France.

THE SUDAN

790. The SUDAN, or Negroland, the land of the Blacks, lies to the south of the Sahara, and stretches from Senegambia on the west, to the region of the Nile on the east. The west and south are hilly, but most of the country consists of large plains watered by great rivers and separated by sandy tracts. The western half is traversed by the Niger; the eastern half includes the basin of Lake Chad.

791. The principal States are Bambarra and Timbuctoo on the Upper Niger; Gando on the Lower Niger; Sokoto east of Gando; Bornu south-west of Lake Chad; Bagirmi south-east of Lake Chad; Kanem to the north, and Wadai to the eastward. With

the exception of Wadai, which forms with Kanem and Bagirmi an independent Negro Sultanate, all the Sudan is now included in French or British territory. French territory is continuous from Algeria to the Niger; while England holds Nigeria and the Egyptian Sudan lying west of Wadai. The area and population are large but uncertain. The inhabitants are chiefly *Negro* tribes, mingled with *Fulahs*, or *Fellatahs*, a mixed race, partly of Negro, partly of Moorish descent. Most are in a low state of civilization, but some, and particularly the Hausas, are rapidly advancing under British influence. Agriculture and cattle-rearing are pursued to a considerable extent, and there are some rude manufactures. The languages, which are numerous, have not been reduced to writing. Muhammadanism has of late made great progress in the whole of this region.

792. Towns. **Sego**, where Park the traveller first saw the Niger, is the capital of Bambarra. **Timbuctoo**, near the Niger, the first place reached by caravans from the north, is a great trading centre. Both are now included in French Sudan.

WESTERN AFRICA

793. Western Africa includes the long range of coast from Morocco to the Tropic of Capricorn, and extends several hundred miles inland. It embraces **Spanish Africa** and **Senegambia** in the north, **Upper Guinea** in the centre, and **Lower Guinea** in the south.

794. Surface and drainage. The **Kong Mountains** form part of the boundary between the Sudan and Western Africa. Extensive tracts of lowland stretch along the coast, but in some cases, as in Sierra Leone (Lion Hill), the mountain ranges run almost to the shore. The **Cameroons** are lofty mountains opposite the island of Fernando Po in the Bight of Biafra. In addition to the larger rivers that have been already noticed the **Senegal**, **Gambia**, and numerous other smaller streams enter the sea by mouths generally hidden under a dense mass of the rankest vegetation.

795. Climate and Produce. The climate is very hot, and along the north coast of the Gulf of Guinea, where the rainfall is heavy and the vegetation rank, so unhealthy to Europeans that West Africa has been called the "white man's grave." The rainy season lasts from June to October. *Yams*, the *cassava*, *plantains*, *maize*, *millet*s, *beans*, *indigo*, and *pepper* are cultivated. *Palm-oil*, *oil-nuts*, and *ivory* are the **exports**, and *cotton goods* are the chief **imports**.

796. Political Divisions. The entire coast from Morocco to the southern point of the continent is claimed by various European Powers, with the single exception of a strip at the north-west corner of the Gulf of Guinea which is held by an independent Negro Republic.

797. The **SPANISH PROTECTORATE** includes the coast from Morocco to Cape Blanco, and extends inland to the Sahara. The interior is little more than a barren desert of granite plateaux. There is a small settlement at **Rio de Oro**.

798. **SENEGAMBIA** takes in all the countries watered by the rivers Senegal and Gambia. Most of it is included in the French settlement of Senegal, which extends inland to the French Sudan. **St Louis**, at the mouth of the Senegal, is the capital. **Bathurst**, near the mouth of the Gambia, is a British settlement.

799. **UPPER GUINEA** includes the whole of the northern coast of the Gulf of Guinea, a monsoon region of abundant rainfall and great natural wealth. The soil is everywhere extremely productive, but owing to the abundant vegetation malaria is common, and an exceedingly severe type of tropical fever is prevalent. Of late years successful efforts have been made to combat this by the destruction of the malaria-carrying mosquito. Along the coast, English, French, and Germans have established trading stations and protectorates.

800. **Sierra Leone**, in the west, is a British settlement founded in 1787 for the suppression of the slave trade. **Free Town** is the capital.

801. **Liberia**, south-east of Sierra Leone, is an independent Negro Republic, which was founded in 1822 by a Society in America to facilitate the emancipation of slaves in the United States. The capital is **Monrovia**, named after President Munro of America.

802. The French Colony of the **Ivory Coast** lies east of Liberia. It is bounded on the east by the English **Gold Coast Colony**, containing the settlements of **Cape Coast Castle** and **Elmina**. **Lagos** is a British settlement on the Bight of Benin.

803. **Ashantee**, now under England, lies in the interior, north of the Gold Coast. The capital is **Coomassie**. **Dahomey**, a native kingdom to the east of Togoland, was lately annexed by the French. **Abbeokuta** is the largest town in the Yoruba Country, east of Dahomey. **Benin** and **Calabar** lie north of the Gulf of Guinea.

804. **Nigeria** extends inland from the coast to Lake Chad. It includes the whole course of the Lower Niger, and that of its great left bank tributary, the **Benue**, together with **Sokoto** one of the largest towns in the Sudan, and the Bornu capital **Kuka**. Nigeria covers half a million square miles, and its population is variously estimated at from 23 to 40 millions. For administrative purposes

it is divided into a northern and a southern province, each under a High Commissioner. Rapid progress is being made in the development of the enormous natural resources of the country, and railways are being constructed in several directions. In 1906 the foreign trade amounted to over £4,000,000.

805. The German Settlements include **Togoland**, a small district east of the Gold Coast, and the **Cameroons**, including the Cameroon Mountains, and stretching northwards to Lake Chad.

806. **LOWER GUINEA** is the name given to the east coast of the Gulf of Guinea. In the north the conditions are similar to those of Upper Guinea, except that the rainfall is less, and rapidly decreases to the south. Lower Guinea comprises *French Congo*, the *Congo Free State*, and the Portuguese Colony of *Angola*.

807. **French Congo** includes the territory between the German Cameroons and the Congo Free State. The *Gaboon* and *Ogowai* are two of the principal rivers. **Brazzaville** is a station on the Congo.

808. The **Congo Free State** comprises the greater part of the Congo basin, and extends inland to Lake Tanganyika. It was held by King Leopold of Belgium as a personal possession, but has now been made over to the Belgian Government. It has an area of 900,000 square miles, and a population of over 30,000,000. **Boma** on the lower Congo, and **Matadi** at the limit of navigation are the chief towns. The chief products are *india-rubber*, *palm-oil*, *ivory*, *cocoa* and *coffee*. The foreign commerce of the State has more than doubled in the last four years, and is now over £3,000,000. A railway 250 miles in length connects Matadi with Stanley Pool.

809. The Portuguese Colony of **Angola** lies south of the Congo Free State. **St Paul de Loanda**, on the coast, is the chief settlement. **Benguela** is a port further south.

SOUTH AFRICA

810. South Africa consists chiefly of plains and table-lands bounded on the south and east by ranges of mountains. The **Nieuwveld**, **Sneuwbergen**, and **Drakenberg** mountains extend along the south-eastern coast. The **Orange River**, or **Gariiep**, flows westward into the Atlantic.

811. **Climate.** The climate is hot and dry in the north and west, healthy and temperate in the south. December and January are the warmest months, June and July the coldest. The table-lands, called *Karroos*, are very dry. The **Kalahari Desert**, to the north of the Orange river, is almost rainless.

812. Products and Trade. *Diamonds* are found in the basin of the Orange River. Rich *gold-fields* have been discovered in the Transvaal, and have been worked with immense success for the last ten years. *Wheat, barley, oats,* and the *cane* are cultivated. The lion, giraffe, zebra, and deer are the principal wild animals. Cattle, sheep and horses are largely reared, and ostrich-farming is common. *Wool, diamonds, gold, skins, ostrich feathers,* and *copper* are the chief **exports**; *clothing and metals* are the chief **imports**.

813. People. The principal native tribes belong to the Bantu family. Some of them, as the **Kaffirs** and **Zulus**, are athletic, warlike races. The **Basutos** and **Bechuanas** are other important tribes. The **Hottentots**, in the west, are proverbial for ignorance, laziness, and dirt. The European inhabitants consist chiefly of Dutch and English colonists.

814. GERMAN SOUTH-WEST AFRICA, between Angola and Cape Colony, includes Damaraland and Great Namaqualand. Nearly the whole of it is desert. **Walfish Bay** (Whale Fish), the only natural harbour, belongs to Britain.

815. CAPE COLONY takes its name from the Cape of Good Hope. It extends from the south coast of Africa to the Orange River, and from the Atlantic to the Great Kei River. The area is about 277,000 square miles, and the population nearly 2½ millions. The land rises from the sea by a series of terraces towards the **Nieuwveld** mountains which traverse the Colony from east to west; and on the north arid plains slope towards the Orange River. The Colony is under a Governor appointed by the Crown, with an elected parliament.

816. Products. *Grain, fruit, wine, cattle,* and *wool*, with *gold* and *diamonds*, are the chief products. Diamonds were discovered only a few years ago on both banks of the **Vaal**, a tributary of the Orange River. The total value of imports and exports in 1904 was over 50 millions sterling.

817. Towns. As the bulk of the people are engaged in agriculture the towns are of no great size. **Cape Town** (51,000) the capital, situated on the south-west of Table Bay, and **Port Elizabeth** (23,000) on Algoa Bay, are the chief seaports. Cape Town was more frequented by shipping before the Suez Canal was opened, but it is still the most important coaling station in the southern oceans. Table Mountain, near the

town, derives its name from its flat summit. **Kimberley**, celebrated for its diamond mines, has a population of 28,000.

818. NATAL, north-east of Cape Colony, is a self-governing British Colony, formed in 1856. With Zululand, which was added to it in 1897, it has an area of over 35,000 square miles, and a population of 1,100,000. It is chiefly agricultural. Its imports and exports in 1906 amounted to £21,000,000. **Pietermaritzburg**, the capital, is inland. **Durban** is the chief seaport. **Ladysmith**, a military station in the north, was besieged by the Boers in the late war.



Fig. 147. Parliament House and Table Mountain, Cape Town.

819. BASUTOLAND is a small territory of about 10,000 square miles, lying between Natal and the Orange River Colony. It is under a Commissioner and has a population of about 250,000.

820. The ORANGE RIVER COLONY (capital, **Bloemfontein**) and the TRANSVAAL (capital, **Pretoria**) are inland British Territories. Till 1900 they were independent Republics under the suzerainty of Britain. In 1899 they rebelled and declared war against England. They were conquered and annexed to the Empire, being made Colonies under British Governors. **Johannesburg**, the chief town, is the centre of the gold-mining industry.

821. BECHUANALAND is a British Protectorate to the north of Cape Colony, stretching northward as far as the Zambezi. The area is 213,000 square miles and the population about 250,000. The native tribes are a peaceable agricultural people. Each Chief governs his country under the control of a resident British Commissioner.

822. RHODESIA lies to the north of Bechuanaland and the Transvaal, and stretches in a north-westerly direction between the two Portuguese territories on the east and west coasts. The river Zambezi divides it into two parts, Northern and Southern Rhodesia. The area is nearly 300,000 square miles, and the population is estimated at about three-quarters of a million. **Salisbury, Bulawayo and Umtali** are the chief stations. Rhodesia is under the administration of the *British South Africa Company*.

823. Railways. There are now over 4,000 miles of railway in British South Africa, four main lines running inland from Cape Town, Port Elizabeth, East London (in Cape Colony), and Durban (in Natal). The late Cecil Rhodes planned the union of Cape Town and Cairo by a railway passing through the Great Rift Valley and along the Valley of the Nile. He pushed the southern line northward to Bulawayo, while Kitchener pushed the northern line south to Khartum. The southern section has now been continued beyond the Zambezi, crossing the river at the Victoria Falls. (See map on page 329.)

EASTERN AFRICA

824. Eastern Africa includes the coastal territories from Zululand to the Straits of Bab-el-Mandeb. With the exception of the island of Zanzibar, nearly the whole has been claimed by European nations. The coasts are generally low, in some parts sandy, in others marshy. A chain of mountains, some of whose peaks are covered with perpetual snow, bounds the interior table-land, which includes the lake region. The **Zambezi**, the principal river, flows eastward into the Mozambique Channel. The **Shiré** is a large tributary of the Zambezi from Lake Nyassa. *Gold, ivory, gum, and oil* are the chief exports; *cotton goods and beads*, the chief imports. There are few roads, and goods are carried chiefly by men, as the bite of the small *tse-tse fly* is fatal to horses and cattle. It has recently been proved that the bite of this fly is also the cause of the sleeping sickness so fatal to man.

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825. PORTUGUESE SETTLEMENTS. The Portuguese territory extends from Delagoa Bay to Cape Delgado. **Mozambique**, on an island, is the chief town. **Quilimane** is on one of the mouths of the Zambezi: **Sena** is an inland town on the Zambezi.

826. GERMAN EAST AFRICA, extends along the coast from the Rovuma river, near Cape Delgado, to near the island of Pemba; and north-westward to the lakes Tanganyika and Victoria Nyanza. It includes the mountain Kilima Njaro. **Dar-es-Salaam** is the chief seaport. **Ujiji** is a station on Lake Tanganyika.

827. The possessions of the **SULTÂN OF ZANZIBAR** include the islands of **Zanzibar** and **Pemba**. Zanzibar, the capital, on the island, is the largest town in Eastern Africa. The Sultân is now under British Protection.



Fig. 148. Zanzibar.

828. BRITISH EAST AFRICA extends along the coast from German East Africa to the river Juba, and inland beyond the Albert Nyanza. It stretches northwards to Abyssinia and the Egyptian Sudan, and includes the British Protectorates of East Africa and Uganda. The chief station is **Mombasa**, on an island. The **Mombasa-Victoria Railway**, nearly 600 miles in length, connects Uganda with the coast.

829. ITALY claims a protectorate over **Somaliland**, extending from the river Juba to beyond Cape Guardafui, and over the south-west coast of the Red Sea. The Somalis and Gallas are wild independent tribes. **Assab**, near the Straits of Bab-el-Mandeb, and **Massowa** are

the chief Italian ports on the Red Sea. **Northern Somaliland**, which lies south of the Gulf of Aden, is under Britain. **Zeila**, near the Straits of Bab-el-Mandeb, and **Berbera** are two seaports. The French **TAJURA BAY PROTECTORATE**, with **Obock** as its port, is near the entrance to the Red Sea.

ISLANDS OF AFRICA

830. Socotra, east of Cape Guardafui, is noted for its aloes. It belongs to Britain.

831. Madagascar, to the east of the continent, and separated from it by the deep **Mozambique Channel**, is more than 1,000 miles in length, and has an area of 228,000 square miles, with a population of $2\frac{1}{2}$ millions. It is traversed by mountains from north to south. The interior is cool and healthy, but the coasts are hot and feverish. The soil is very fertile, and cattle are numerous. The **Hovas**, who are the principal inhabitants, are chiefly of Malayan origin. Madagascar is now a French colony. **Antananarivo**, near the centre, is the capital. **Tamatave**, on the east coast, is the principal seaport, but **Diego Suarez**, in the extreme north, has one of the finest natural harbours in the world. The foreign commerce amounts to over £2,000,000, the principal **exports** being *fibres, gold, flour, and metal work*.

832. The Comoro Islands are a group midway between Madagascar and the mainland of Africa lately annexed by France. **Bourbon** (or **Reunion**) and **Mauritius** are small sugar-growing islands east of Madagascar. The former belongs to France, the latter to England. The chief town of Mauritius is **Port Louis**. The **Seychelles** (say-shell) and **Amirante Islands** are small coral groups to the north of Mauritius.

833. St. Helena and Ascension are small islands in the Atlantic belonging to Britain. **Fernando Po** in the Bight of Biafra belongs to Spain, as also does the beautiful group of the **Canary Islands**, south-west of Morocco. **Teneriffe**, the largest of these islands, contains a lofty volcanic peak.

834. Madeira, north of the Canary Islands, belongs to Portugal, and is far famed for its mild climate and excellent wine. The **Cape Verde Islands**, to the west of Cape Verde, also belong to Portugal.

AMERICA

GENERAL VIEW

835. AMERICA—the “NEW WORLD”—lies west of Europe, separated from it by the Atlantic Ocean. On its western side the Pacific Ocean separates it from Asia. The continent was named after a Florentine, **Amerigo Vespucci**, who visited it in 1499 and on his return to Europe published the first account of the newly discovered land. As early as 982 A.D., a Norwegian had discovered Greenland, but **Columbus**, by his expedition in 1492, first made the New World known to civilized Europe. North America was discovered by **Sebastian Cabot**, in the employ of Henry VII. of England, in 1497. The entire continent consists of two great triangular land-masses with the apex in each case pointing to the south. These two masses form **North America** and **South America**, and are connected by a narrow neck of land, the **Isthmus of Panama**. The entire continent extends from Lat. 72°N. to 54°S. Its length from north to south is about 10,000 miles. Its area is nearly 16 million square miles, of which North America contains about 9 millions and South America 7 millions. An important point of contrast between the two divisions of the continent is the fact that in North America the greatest width of the land lies in the temperate zone while in South America the greatest width lies in the torrid zone. North America is remarkable for its great lakes; South America for its great rivers.

836. North America, like Europe, has a deeply indented coast-line and many inland seas. South America resembles Africa in the almost unbroken aspect of its coast-line, though it has a greater number of good natural harbours. Through both divisions of the continent an immense mountain chain runs north and south. In this respect America contrasts strongly with the Old World in which all the great mountain

chains run east and west. In both North and South America the main chains run near the west coast, throwing the chief drainage of the continent into the Atlantic. In both, also, the coastal chains abound with volcanoes, and the land dips rapidly to the sea and quickly sinks to great depths. Such rapid declines almost always indicate lines of weakness along which earthquakes occur, and the western parts of both North and South America are subject to vast and often disastrous disturbances of this kind. In both North and South America the folds of the main chain of mountains open out towards the centre, enclosing high basin-shaped plateaux which form regions of inland drainage and contain salt lakes. Along the eastern side of both continents, at some distance from the coast, ranges of lower mountains run from north-east to south-west, forming a second broad stretch of highlands. Between these highland regions, east and west, extend vast central plains drained by mighty rivers into the Atlantic.

NORTH AMERICA

837. Coast Line. In the proportion of coast-line to area North America ranks next to Europe. From the **Isthmus of Panama** the eastern coast curves north. It is at first high and rocky and then sinks to a low level in the swampy and malarial **Mosquito Coast**, east of Nicaragua. From this point it bends to the west and then sharply to the north, where the oblong peninsula of **Yucatan** stretches out towards the island of Cuba. On its other side Cuba is as closely approached by another arm of the mainland, **Florida**, and between the two peninsulas the coast-line sweeps round in an immense curve enclosing the Gulf of Mexico. The northern coast of the Gulf has many small indentations and is broken by several large rivers, the **Rio Grande, Colorado, Alabama**, and, notably, the **Mississippi**. The swampy delta of the last stretches its long muddy arms into the Gulf for more than 100 miles.

838. From **Cape Sable**, at the extremity of Florida, a low coastal plain edged with lagoons curves gently north and east to **Cape Hatteras**. North of this point a succession of deep inlets, of which the **Bays of Chesapeake, Delaware, New York**, and **Boston** are the chief, provide fine natural harbours. From

the promontory of **Cape Cod**, which encloses **Boston Bay**, a line of much indented cliffs stretches northward to **Fundy Bay**, which almost separates the peninsula of **Nova Scotia** from the mainland. Beyond this peninsula spreads the great **Gulf of St. Lawrence** in which lie the continental islands of **Prince Edward Island**, **Breton**, and **Anticosti**. North-east of the Gulf is the great island of **Newfoundland**, separated from **Labrador** on the mainland by the narrow strait of **Belle Isle**, 12 miles wide. From this strait the coast-line turns north-west along the bleak and generally ice-bound cliffs of Labrador to **Hudson Straits**, leading from the Atlantic into **Hudson Bay**. North and north-west of the straits is an immense group of islands lying chiefly within the Arctic Circle. Few of them are much known, and most are covered with perpetual snow.

839. The most striking feature of the north coast is the large opening of **Hudson Bay** which runs inland for nearly 1,300 miles. The broad projection at the extreme north-west of the continent is the dreary Territory of **Alaska**, once Russian, now American. It has a very irregular coast-line, one arm extending to within 40 miles of Asia, while the southern promontory stretches out towards the **Aleutian Isles**, which unite the volcanic line of Eastern Asia with that of Western America. From this point the coast tends generally in a south-easterly direction along the curve of the great mountain chain. In many places the mountains rise sheer from the water, and the coast is cut up into a great number of deep and narrow inlets like the *fjords* of Norway, and fringed with innumerable islands. The most important of these islands are **Sitka**, belonging to the United States, and **Queen Charlotte** and **Vancouver** which belong to Canada. Along the western coast there are few large rivers, as the watershed in most parts is comparatively near the sea. The coast is rocky and has many fine natural harbours, but the chief seaports are **Victoria**, south of Vancouver Island, and **San Francisco**, on a fine Bay in California. South of San Francisco the coast-line bends round to the south-east, and the **Peninsula of California** encloses a long and narrow gulf which receives at its head the waters of the **Colorado**. From this point the continent narrows and curves to the east in Central America.

840. **Surface.** North America has a great central plain extending northwards from the Gulf of Mexico to the Arctic

Ocean. Its eastern limits are the lower ranges of the **Alleghany** or **Appalachian Mountains**, and its western limits are the **Rocky Mountains**. West of the Rockies is a plateau from 3,000 to 4,000 feet in height, with detached ranges of mountains. In the south the **Sierra Nevada**, and to the north the **Cascade Range**, run along the coast. The highest peaks are **Mount St. Elias** (10,500 feet) in the extreme north, and the volcanoes **Popocatepetl** and **Orizaba** in Mexico. A narrow belt of moderate elevation runs right across the continent at its widest part dividing the southern from the northern plains. In the west this ridge attains a height of over 5,000 feet, but in the central and eastern sections it is nowhere more than 3,000 feet. The northern slope is known as the **Height of Land**, and the southern as the **Great Divide**. From this belt of low highlands the land slopes north and south. Immediately south of it lies the chain of magnificent lakes, which is one of the most striking features of the continent—**Lakes Superior, Michigan, Huron, Erie, and Ontario**. North of the ridge are **Lake Winnipeg** and the **Lake of the Woods**. Other large lakes, **Deer Lake, Athabasca, Great Slave Lake** and **Bear Lake** reach across the continent in a north-westerly chain. West of these lakes lie vast and fertile plains. Eastward the land is lower and less fertile. South of the Great Divide are the immense prairies of the Mississippi valley. These prairies are covered with grass but destitute of trees, and are being rapidly brought under cultivation. East of the plain are the Appalachian Mountains, which run south-west for 500 miles from the heart of Pennsylvania and supply a large proportion of the mineral wealth of the continent.

841. Rivers. As the great mountain ranges run along the western side of the continent, bending round to the west in the north, the main drainage is eastward to the Atlantic basin and northward to the Arctic. Most of the rivers flowing into the Pacific are short and swift, draining the steep slopes of the mountains and finding their way to the sea through rocky channels. The rivers flowing eastward, on the other hand, drain either vast and almost level plains or lower hills of much gentler slope, and are generally both longer and slower. The eastern rivers are much more important than the western, as they flow through more densely peopled districts, and past great centres of commercial and industrial activity.



Fig. 149. North America in relief.

842. Of the large rivers draining to the Atlantic basin the most important are the **St. Lawrence** and the **Saskatchewan** in the north, and the **Mississippi**, which drains the great central plain to the Gulf of Mexico, in the south. In the basin of the **St. Lawrence** lie the five great lakes, **Superior** (the largest fresh water lake in the world), **Michigan**, **Huron**, **Erie** and **Ontario**. The river itself is navigable by large ocean steamers as far as the city of Montreal, while for vessels of smaller size the lakes and rivers together form a continuous waterway for 2,000 miles from the Gulf of St. Lawrence, canals having been constructed to unite the lakes wherever rapids hinder navigation. The **Saskatchewan** rises in the Rocky Mountains and on its way east to Hudson Bay flows through some of the most fertile land in Canada. After traversing **Lake Winnipeg** it is called the **Nelson River**. The river and lake are together navigable for 1,200 miles.

843. The **Mississippi** rises in **Lake Itasca**, a small lake west of Lake Superior and south of the Great Divide, and flows almost due south to the Gulf of Mexico. It is the second longest river in the world, having a total course of 3,200 miles. It drains an immense area south of the great lakes, and receives from the west the **Missouri**, the **Platte**, the **Arkansas** and the **Red River**, and from the east, the **Illinois** and the **Ohio** with its tributary the **Tennessee**. The **Missouri** rises in the Rockies near the Canadian frontier, and is a longer river than the **Mississippi**. The **Missouri-Mississippi**, from the source of the **Missouri** to the Gulf of Mexico, has a total length of 4,200 miles. This vast river system, with its numerous tributaries, is navigable for light-draught river-steamers for nearly 5,000 miles, and before the construction of railways was the main commercial highway into the heart of the central plain. As the slope of the plain is very slight the rivers are for the most part broad and slow and tend to silt up. This is especially the case where the **Mississippi** pours its waters into the sea. It has built up an immense delta, most of the channels of which are sluggish and shallow and of little use for ocean steamers. Vast masonry works have been constructed to narrow one of the channels and so, by quickening the flow, to make the river scour out its bed. The only port on the delta is **New Orleans**.

844. Into the Gulf of Mexico flow also the **Colorado** (of Texas) the **Alabama** and the **Rio Grande del Norte**. The last

of these rivers rises amid the mountains of Colorado, and for the last 700 miles of its course forms the boundary between the United States and Mexico. Shorter but not less important are the rivers which flow to the Atlantic from the watershed of the Appalachian Mountains. The chief of these are the **Hudson**, at the mouth of which stands the great port of New York; the **Delaware**, with Philadelphia near its mouth; and the **Potomac**, on the banks of which stands Washington, the capital of the States.

845. The largest of the rivers which drain the steep western slopes of the Pacific are the **Fraser**, which flows into the strait between Vancouver island and the mainland, the **Columbia**, with its tributary **SNAKE RIVER**, which discharges its waters south of Vancouver, and the **Colorado** which flows to the Gulf of California. Between the Colorado and the Columbia is a region of inland drainage, called the **Great Basin**, lying between the Sierra Nevada mountains on the coast and the Rockies, which here recede far into the interior. These mountain chains enclose a broad and arid plateau with an average elevation of 4,000 feet, which drains to numerous lakes, the largest of which is the **Great Salt Lake**. Some of the western rivers have cut for themselves deep channels through the rocks. These are called *cañons*, and some of them are as much as 5,000 feet deep and vary from a few yards to several miles in breadth. In the far north-west the **Yukon**, navigable for 1,000 miles, flows into Behring Sea. East of the Yukon, in the Mackenzie basin, lie **Deer Lake**, **Lake Athabasca**, **Great Slave Lake**, and **Great Bear Lake**. All these are united by the river **Mackenzie** which flows north-westward to the Arctic Ocean. The river and lakes are navigable, with three breaks, for 4,300 miles. The **Great Fish River** drains a barren and stony district north-west of Hudson Bay and also falls into the Arctic Sea.

846. **Climate.** North America is generally colder than similar latitudes in the Old World. A smaller proportion of the land is in the torrid zone, and while there are no mountain chains to check the biting winds that blow from the Arctic region, the long range of the Rockies stop the warmer winds that blow from the Pacific. As in Eurasia the eastern side of the continent is colder than the western. This is due to the fact that the northern branch of the Pacific equatorial current

(see § 113) after skirting Japan, crosses the ocean to the shores of British Columbia and continues its course southwards along the coast of California. On the eastern coast, however, a narrow but deep and cold Arctic current cuts the north-east of the continent off from the genial influences of the Gulf Stream.

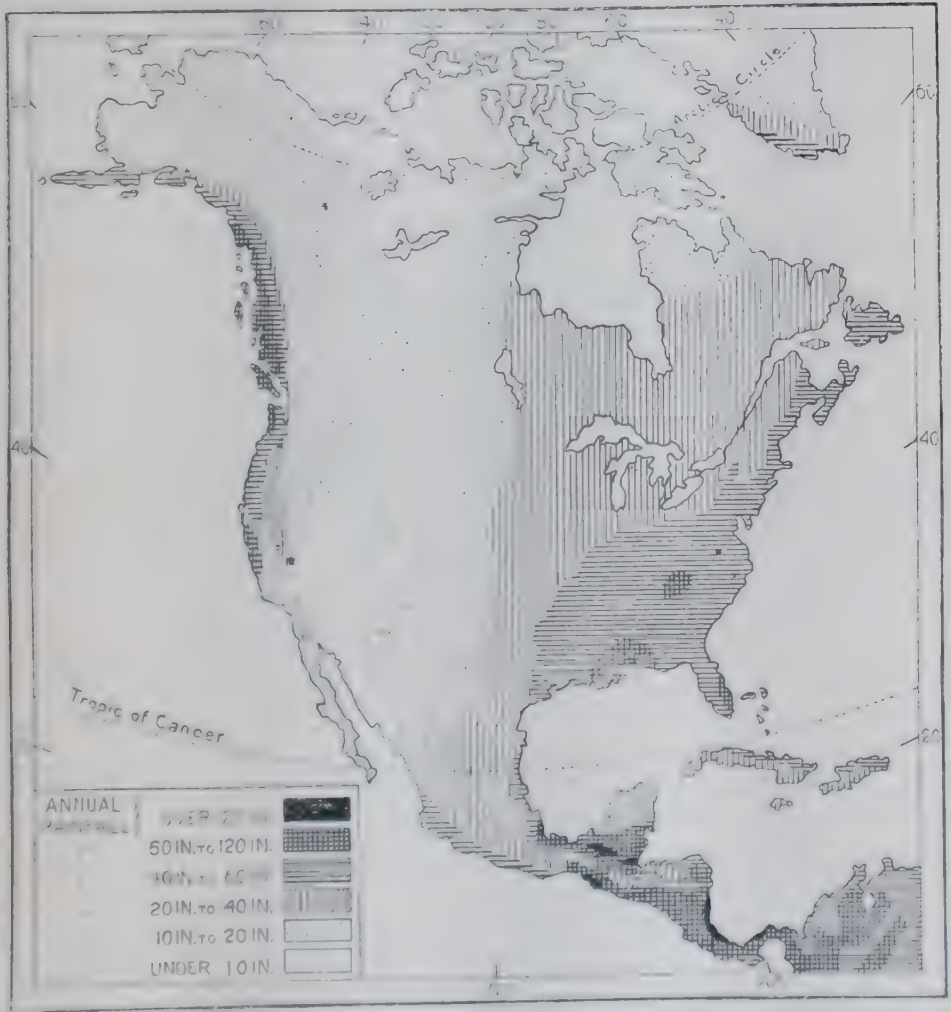


Fig. 150. Average Annual Rainfall of North America.

Labrador, in the same latitude as Britain, is colder than Lapland. As cultivation extends the climate is becoming distinctly milder in many of the northern parts of the continent. The rainfall is heaviest in Central America, along the east coast, and as far inland as the Mississippi. The coast of British

Columbia, and south as far as California, receives an abundant watering from the warm south-west winds that prevail there. The plateau north and east of the Gulf of California is an almost rainless tract, as the winds are mainly from the north-east and have been robbed of their moisture before they reach the plateau.

847. Natural Products. Portions of the Western Plateau are barren and treeless ; but much of the Central Plain consists of alternate forests, often containing trees of immense size, and grassy plains called *prairies*. Cultivation is rapidly

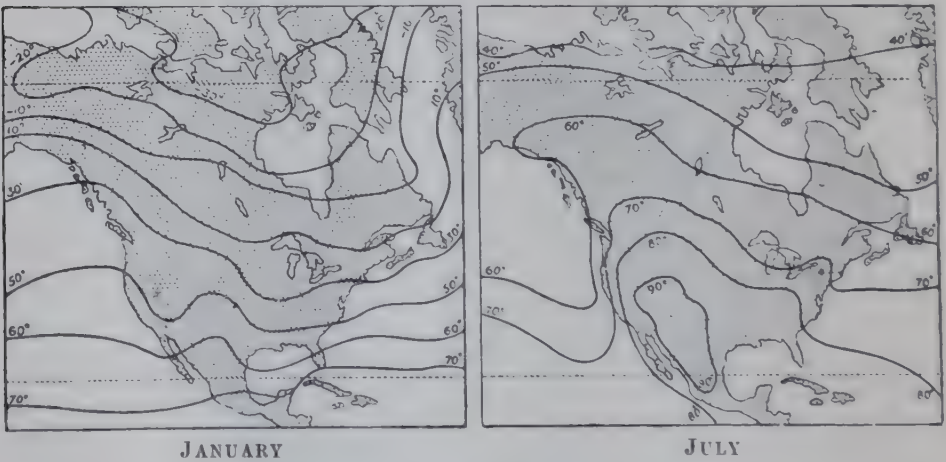


Fig. 151. The Summer and Winter Isotherms.

spreading. **Wheat** and **maize** are raised in the central districts ; **rice**, **sugar**, and **cotton** are grown in the south. The **sugar maple** is plentiful in the United States. **Mahogany** and **logwood** are valuable forest products in the south. The *Sequoia Gigantea*, found in California, is one of the largest known trees. It grows to a height of 450 feet. **Gold** is obtained in considerable quantities in several parts ; **silver** in Nevada and Mexico ; **copper**, **iron**, **coal**, and **salt** are also found. **Petroleum** is obtained in great abundance in the United States.

848. People. The original inhabitants are called **American Indians** (see § 168). It is commonly believed that the aborigines of America came from Asia. Behring Strait is only forty miles across, and at one time there was probably land connection between the two continents. In physical characteristics the American Indians are closely similar to the Mongoloid races. They are copper-coloured, and have straight hair and

high cheek-bones. Their languages are remarkable for the great length of some of the words. The Indians subsist chiefly by hunting, and in spite of efforts to preserve them are gradually disappearing. A short, stout race, called **Esquimaux**, are found along the shores of the Arctic Ocean. They live chiefly by fishing. European settlers now form the bulk of the population. **Negroes** from Africa are numerous in the south. The white inhabitants are estimated to amount to about 75 millions; Indians to 5 millions; Negroes to 14 millions, and mixed races to 9 millions. The Protestant form of Christianity prevails in the United States; the Roman Catholic from Mexico southwards.

BRITISH NORTH AMERICA

849. BRITISH NORTH AMERICA is bounded on the north by the Arctic Ocean; on the east by the Atlantic; on the south by the United States; and on the west by the Pacific Ocean and Alaska. It includes the DOMINION OF CANADA and NEWFOUNDLAND, and has an area of about $3\frac{3}{4}$ million square miles. In extent it is almost equal to the whole of Europe, and more than twice the size of the Indian Empire. Its population is, however, only about $5\frac{1}{2}$ millions, but is rapidly increasing.

DOMINION OF CANADA

850. The DOMINION OF CANADA consists of the whole of the northern portion of North America save Alaska. To the south lie the United States of America, the boundary line for nearly half-way across the continent from west to east being the 49th parallel N. Lat. The boundary then runs through the Lake of the Woods, Lakes Superior, Huron, Erie and Ontario and thence down the St. Lawrence river as far as the 45th parallel. It continues along this parallel for 150 miles, then turns and makes a curve to the north-east and afterwards, running almost due south, strikes the shore of Fundy Bay near the St. John river. (See map p. 365.)

851. General Features. In the north of this vast Dominion are many dreary and barren islands covered with perpetual snow and surrounded by seas which are ice-bound for the greater part of the year. The western portion, from the Rocky Mountains to the Pacific, consists of mountains and plateaux with numerous narrow and well watered valleys. In the south of the Dominion, east of the Rockies, the surface as a whole is fairly level, broken only by the gentle slopes of the Great Divide, and the land is fertile. There are great belts of forest full of valuable timber, vast prairies, and around the settlements extensive areas of cleared and cultivated land. The last, though large in themselves, are small when compared with the vast stretches of rich virgin soil that still await cultivation. In south central Canada there are hundreds of thousands of square miles of land yet untouched that is admirably adapted for the growth of cereals or for rich pasture land. Given a sufficient population and means of transport Canada could supply the whole world with wheat. The settlement of the country west of Lake Winnipeg has of late years proceeded at an increasingly rapid rate, the railways having brought the inland districts into touch with the coast.

852. Communications. The great rivers have already been mentioned. Till railways were constructed the St. Lawrence, with its vast system of lakes, was the chief commercial route in the east, and hence all the great eastern cities of the Dominion are situated on it. From Hudson Bay there is water communication along the Nelson to Lake Winnipeg, and westwards on the Saskatchewan. But railways have made the waterways of secondary importance. The **Canadian Pacific Railway** stretches across the entire width of the continent from Montreal on the St. Lawrence to Vancouver on the Pacific coast. This line forms part of one of the mail routes between Great Britain and China. The **Intercolonial Railway** puts the chief eastern port, Halifax, in Nova Scotia, into communication with Montreal, as well as with the other chief eastern towns. The **Grand Trunk Railway** unites Canada with the United States at several points, and extends westwards to Lake Michigan. Another line of the same system running right across the continent to Prince Rupert, on the coast of British Columbia, is now under construction. All these lines have many smaller branches.

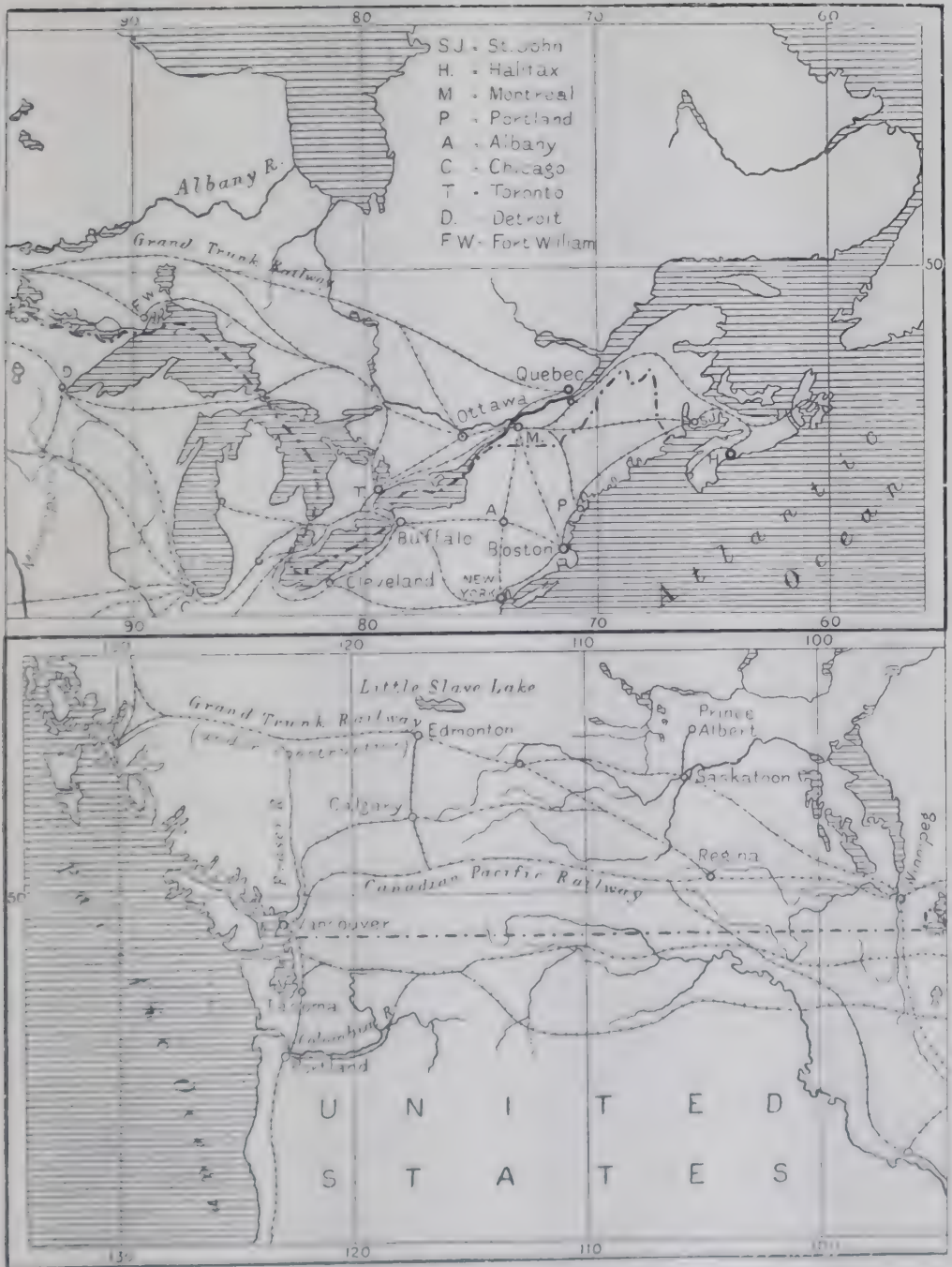


Fig. 162. Showing the Railways of Canada. The upper part of the map is the eastern portion of the Dominion, and the lower part is the western portion.

853. Climate and Products. The winters are exceedingly severe, and the ice on the lakes is often 8 ft. thick. But the air being dry and the sky clear the extreme cold is invigorating. The summers are brief, but hot. The rainfall is greater in the east than in the west, save on the coast of British Columbia where it is heavy. East of Winnipeg it averages over 20 inches a year, and on the east coast over 40 inches. West of Winnipeg it is under 20 inches. The hot summers, and the comparative dryness, make the districts from Winnipeg to the Rockies exceedingly suitable for the cultivation of **wheat**, and enormous and ever increasing areas are devoted to this grain. **Barley** and **oats** are more grown in the north, and in good seasons barley ripens as far north as Fort Norman in Lat. 65°N . **Potatoes** and various **pulses** are grown everywhere; **maize**, **tobacco** and **flax** chiefly in the provinces along the St. Lawrence. In the prairies of the west vast herds of **cattle** are reared, and **cheese** is a staple product. The forests yield valuable **timber**, especially birch, maple, and cedar, which is floated down the rivers in rafts. The Dominion is also rich in minerals. There are extensive **coal** beds, and those in Nova Scotia already supply all the coal required by the railways. **Iron**, **nickel**, **petroleum** and **cobalt** are also abundant. The nickel mines of Ontario are the most productive in the world. **Gold** is found at Klondyke in the Yukon basin, and **silver ore** of unusual richness has recently been discovered at Cobalt, a new settlement on the Ottawa.

854. History. The present provinces of **Quebec** and **Ontario** were founded in 1608 by the French, who held the country till 1759 when, during the Seven Years War, Quebec was taken by Wolfe. The entire French possessions in America then fell to the English, and were formally surrendered by France in the treaty which brought the war to a close in 1763. The **Hudson Bay Company** was established in the reign of Charles II. to trade in furs. It had about 140 forts, or factories, in various parts of the country, the principal being **Fort York** on Hudson Bay, near the mouth of the Nelson river. The Company surrendered its rights to the British Government in 1859. The western districts of Canada were settled during the early part of last century. In 1867 the whole of the British possessions in North America, save Newfoundland, were formed into the DOMINION OF CANADA.

855. Government. The DOMINION is a confederation of self-governing Provinces under a Governor-General, or Viceroy, appointed by the Crown. There are nine Provinces—**Nova Scotia, Prince Edward Island, New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan, Alberta, and British Columbia.** Each Province has a Lieutenant-Governor appointed by the Viceroy, and an elected Assembly; while for the entire Dominion there is a Parliament of two Houses—the **Senate** and the **House of Commons.** There are also two *territories*, which will no doubt in time become *provinces*, the **North-West Territory** and **Yukon.**

856. NOVA SCOTIA (*New Scotland*) is a peninsula south of the Gulf of St. Lawrence and east of New Brunswick. It has a cold but healthy climate, and the country is rich in *coal* and *iron.* The *timber* trade and *fisheries* are valuable. **Halifax** (40,830), on the east coast, has a magnificent harbour, and is the chief Atlantic seaport of the Dominion. The harbour is free from ice all the winter, and there is regular steam communication with Britain. The island of **Cape Breton** is included in the province.

857. PRINCE EDWARD ISLAND, the smallest of the Provinces, lies in the Gulf of St. Lawrence, north-east of Nova Scotia. The soil is fertile and the country enjoys a milder climate than prevails over the neighbouring provinces. **Charlottetown** (12,000) is the capital.

858. NEW BRUNSWICK, the eastern portion of the peninsula formed by the Bay of Fundy and the St. Lawrence river, is slightly larger than Ceylon. The surface is mostly covered with dense forest, and timber is largely exported. *Ship-building* is carried on to a considerable extent, and the *fisheries* are very valuable. **St. John** (40,700), on Fundy Bay, is the largest town, and **Frederickton**, on the river St. John, is the capital. The Grand Trunk Pacific Railway now under construction starts from **Moncton** on the east coast, and will extend to **Prince Rupert** at the mouth of the Skeena river on the Pacific coast. The Bay of Fundy is remarkable for its tides.

859. QUEBEC, formerly called LOWER CANADA, is the oldest of the Provinces, and has great historic associations. It lies on both sides of the river St. Lawrence, and is mainly peopled by descendants of the original French settlers. The principal productions are *cereals* in the south and *timber* from the pine

and birch forests in the north. The capital, **Quebec** (68,800), stands in a commanding situation on the **Heights of Abraham**, north of the river. In 1759 the French were defeated near here by General Wolfe, who died in the moment of victory. **Montreal** (267,700), the largest city in the Dominion, is situated on an island 2,000 miles up the St. Lawrence river. The **Ottawa** river unites with the St. Lawrence on the north of the city, and on the other side a ship canal leads south to Lake Champlain in the United States. From Montreal the Canadian Pacific Railway starts on its long journey of nearly 3,000 miles across the continent to Vancouver. Many other lines converge here.

860. ONTARIO, formerly called **UPPER CANADA**, lies between Quebec and Manitoba. The great lakes Superior and Huron form its southern boundary. The soil is fertile, and *wheat* and *oats* are the principal crops. *Fruit* is also largely grown and *timber* is obtained from Ottawa. An enormous amount of traffic passes through the canal connecting Lake Superior and Lake Michigan. The Falls of Niagara are on the river which connects Lakes Erie and Ontario. **Ottawa** (60,000), the capital of the Dominion, is a handsome city well situated on the Ottawa river. **Toronto** (208,000), near the west end of Lake Ontario, is the chief commercial city, and contains the principal University of Canada. **Hamilton** (52,000), is a busy and thriving trade centre. **Kingston** (18,000) is the oldest city in the province, and has a military college. The first settlers in Ontario were men who, at the close of the American War of Independence, remained loyal to Britain and, preferring British institutions and forms of government, left the States and settled here.

861. MANITOBA. This Province was formerly called the **Red River Settlement**. It lies between Ontario and the new Province of Saskatchewan. Great quantities of wheat are grown. **Winnipeg** (110,000), the capital, stands at the junction of the **Assiniboia** and **Red Rivers**, and is an important railway centre and a rapidly growing city. The climate is good, but extremes of temperature are common.

862. SASKATCHEWAN was made a Province in 1905, having previously belonged to the North West Territories. It lies east of Manitoba and stretches north to the 60th parallel of latitude, including the Deer Lake and the greater part of Lake

Athabasca. It is a great wheat growing province **Regina** is the capital.

863. ALBERTA. Like Saskatchewan, this province was formed in 1905 from the North West Territories. It lies west of Saskatchewan, and stretches from the 49th parallel of latitude to the 60th. Grain crops flourish as well here as in Saskatchewan. The capital is **Edmonton**.

864. BRITISH COLUMBIA consists of the mountainous country bordering the Pacific and includes the numerous islands off the coast, of which the largest are **Vancouver** and **Queen Charlotte Islands**. The climate, particularly of Vancouver island, is very similar to that of England. The chief products are *gold, copper, coal, and timber*. **Victoria** (20,800), on Vancouver island, is the capital, and from here the mail steamers start for Japan and Australia. **New Westminster** is the centre of the salmon-tinning industry.

865. Each of the TERRITORIES is administered by a Commissioner appointed by the Viceroy, and has an elected Assembly. The **North West Territory** now comprises the districts formerly known as Rupert's Land, Mackenzie, Ungava, and Franklin. Keewatin is a barren district on the north-western borders of the Hudson Bay. **Yukon** was constituted a separate Territory in 1898. Since the discovery of gold in 1896-97 **Dawson City** (9,000) has sprung up at the junction of the Klondyke and Yukon rivers.

NEWFOUNDLAND

866. NEWFOUNDLAND is the oldest British Colony. It was discovered by Sebastian Cabot in 1497 and was taken possession of by Britain in 1583. It is a large and rugged island standing on the continental shelf east of the Gulf of St. Lawrence. The **Strait of Belle Isle**, which separates the island from the mainland of Labrador, is 12 miles across. The coast is much indented, and there are good harbours in the south. The climate is damp and cold along the southern and eastern coasts where fogs are common. Inland it is usually clear and bright. The island does not experience extremes of either heat or cold. There are extensive *pine forests* in the north. *Copper, iron, and coal* are also abundant. But the chief wealth of Newfoundland is derived from the valuable *cod and seal*

fisheries on the great Banks of Newfoundland, which extend for 400 miles to the south-east. From the first both English and French settled on the coast, and the French have now recognised rights in the fisheries through the possession of two very small islands close to the mainland. **St. John's**, the capital (30,000), in the south-east of the island, has a fine harbour and is a handsome and prosperous town. It is nearer to Europe than any other American town, being less than 1,700 miles from Cape Clear in Ireland.

867. Labrador, the most eastern portion of the continent of N. America, is, for administrative purposes, considered part of the Colony of Newfoundland. Little is known of the interior of this frost-bound country. Though lying in the same latitude as the British Isles, it is permanently chilled by cold winds from the north, as well as by the Arctic Current flowing along its coast. There are several Missionary settlements among the Esquimaux, who are the only inhabitants.

GREENLAND

868. GREENLAND, or DANISH AMERICA, lies north-east of North America, and is almost entirely within the Arctic Circle. It is a mountainous and desolate island, or a number of islands bound together by ice, and is completely covered in the interior by a vast "ice-cap" probably many thousands of feet in thickness. The east coast is broken by a large number of giant glaciers, the greatest in the world. Some of these move with unusual rapidity, a speed of 90 feet in 24 hours having been observed. All the icebergs of the north Atlantic have their origin in the Greenland glaciers. Drifting southwards in the Arctic Current which flows along the coast, they chill the atmosphere and give rise to the thick fogs which often prevail for weeks together in the north-western Atlantic. Off Newfoundland the eastern portion of the Arctic Current dips beneath the Gulf Stream, and the western (the "Cold Wall," see § 113) clings to the American coast as far south as New York. In the warmer waters of the Gulf Stream the icebergs speedily melt, and the "Banks of Newfoundland" have been built by the stones etc., which the icebergs have brought with them.

869. The original inhabitants of Greenland are hardy tribes of **Esquimaux**, who subsist mainly by hunting and fishing. On the south-west of Greenland there are a few Danish settlements, that coast being slightly warmed by an arm of the Gulf Stream flowing up through Davis Strait. Greenland was colonized from Iceland in the 10th century. The settlers prospered for three hundred years, but about the year 1400 A.D. all perished at the hands of the Esquimaux. The ruins of some of their buildings still exist. **Frederikshaab** and **Upernavik** are the chief Danish settlements, the latter being the most northerly settlement in the world. The island was crossed by Dr. Nansen, a Norwegian traveller, in 1888.

THE UNITED STATES

870. The UNITED STATES are bounded on the north by British America, and on the south by Mexico, and extend from the Atlantic to the Pacific. They are almost as large as Europe, having a total area of 3,567,000 square miles.

871. Physically the States may be divided into five great sections: the **Atlantic Slope**, the **Central Plain**, the **Western Plateau**, the **Pacific Slope**, and the cold, desolate region of **Alaska**, formerly Russian. The Central Plain is the largest division, including the entire basin of the Mississippi. The Atlantic Slope is the most thickly peopled. The Pacific Slope is long and narrow. The Rocky Mountains are the back-bone of the continent and form the eastern boundary of the Western Plateau. The Cascade Mountains and the Sierra Nevada are ranges on the Pacific coast, which form the western boundary of the Plateau.

872. **Rivers.** There is no country in the world, of equal extent, so well watered as the United States. The **Connecticut**, **Hudson**, **Delaware**, **Susquehanna**, and **Potomac**, flow eastward into the Atlantic. The **Mississippi**, flowing southward into the Gulf of Mexico, receives on the east the **Wisconsin**, **Illinois**, and **Ohio**; on the west, the **Missouri**, **Arkansas**, and **Red River**. The **Colorado** falls into the Gulf of California. It flows through a high plateau whose strata, largely volcanic, are almost

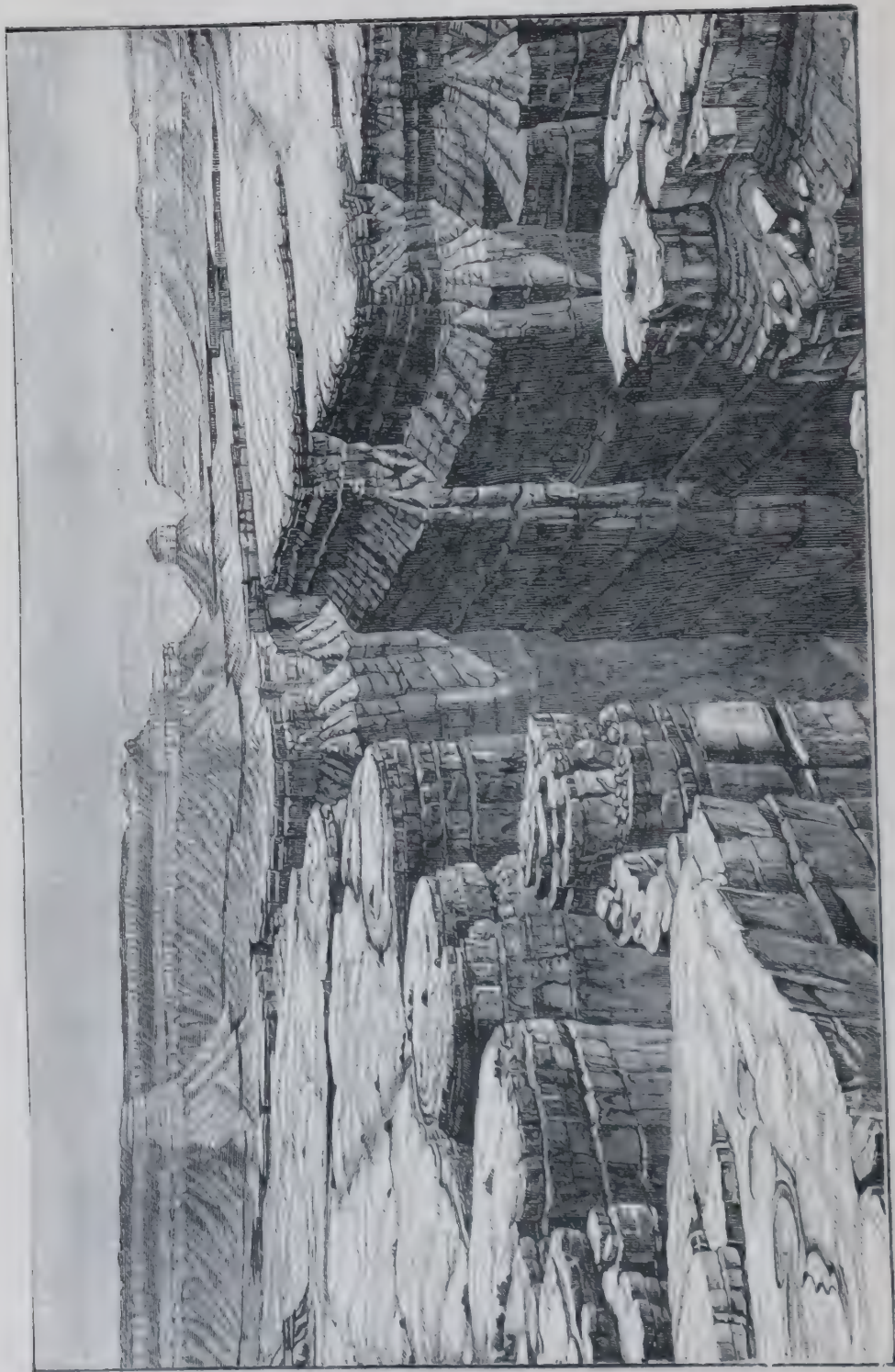


Fig. 153. View of the Grand Cañon of the Colorado River. It is more than 200 miles long, and its walls are in some parts over 6,000 ft. deep.

perfectly horizontal. The atmosphere is so dry that there is hardly any "weathering," and the river has cut for itself a deep channel with almost perpendicular walls. The **Sacramento** and **Columbia** flow westward into the Pacific. The Missouri is about 3,000 miles in length; the Arkansas, 2,000 miles; the Red River, 1,500 miles; the Ohio, 1,000 miles. The Connecticut and Potomac are each about 400 miles long.

873. Climate. In a country so large and extending from just outside the tropics to the latitude of northern France, every variety of climate is to be found, cold in the north-east, temperate in the middle, and warm in the south. The rainfall is below the average for the latitude, especially in the western half of the country. The Western Plateau is, in places, nearly rainless. The skies all over the States are generally bright and clear. The north-east is liable to sudden and severe variations of temperature owing to changes of wind; and almost everywhere extremes of heat and cold are experienced. An arctic current chills the eastern coast, cutting it off from the Gulf Stream.

874. Natural Products. Alaska and some parts of the Western Plateau are barren; but in general the soil is fertile. In the Mississippi valley there are immense prairies which are being rapidly brought under cultivation. *Maize, wheat, cotton, rice, tobacco, sugar, flax, hemp,* and *timber*, are the principal vegetable products. Maize is very largely consumed as an article of food. Wheat is the chief grain exported. Cotton, rice, and sugar are raised in the south. There is more cotton grown in the United States than in any other country. Sugar is extensively manufactured from the *sugar-maple* tree. *Iron, lead, coal,* and *petroleum* are found in great abundance, and *gold* and *silver* are obtained in different parts. The United States yield more silver than any other country.

875. People. The population, about 76 millions, is rapidly increasing, partly by people pouring into the country from Europe. About 67 millions are either natives of Europe, or of European descent; about 9 millions are Negroes; and about a quarter of a million are Red Indians. The European settlers are chiefly from the British Isles and Germany. Many French descendants are found along the lower course of the Mississippi. The Indian Territory lies to the north of the Red River, but some of the tribes occupy the unsettled districts near the

Rocky Mountains. There are a considerable number of Chinese settlers in almost all the great towns, particularly in the west.

876. Commerce. The commerce is very extensive, and is second only to that of Britain. The principal **imports** are *sugar, coffee, woollen and cotton goods, hides, india-rubber, silks and hardware*; the **exports** are *cotton, grain, kerosene oil, bacon, timber, and tobacco*. The chief industries are iron and steel manufactures, textiles, timber working, and meat and fruit canning. Almost half the foreign trade is carried on with England and her colonies, and more than one-sixth with Germany. The north-eastern States are the most advanced both in commerce and manufacture; the central and southern States are agricultural; and mining has been chiefly developed in the western States. All the large centres of industry are connected with the coast by rail. The railways of the United States are now over 212,000 miles in length—nearly equal to the whole of the railways of Europe and Asia. The **Union Pacific Railway**, 3,000 miles in length, stretches across the continent from New York to San Francisco, the chief port on the Pacific sea-board.

877. Government. The United States form a **Federal Republic**, with an elected President, a House of Senators, and a House of Representatives. At present there are 46 States and 4 Territories, besides the small district of Columbia in which Washington, the capital, is situated. The President is elected for four years. Senators for six, and Representatives for two. Each State elects two Senators. One Representative is allowed for every 154,000 inhabitants. The legislative power is vested in the House of Senators and the House of Representatives, which together are called the **Congress**; and the supreme executive authority is vested in the **President**. Each State manages its own affairs by means of a Governor, a Senate, and a House of Representatives. The Territories are under the Federal Government; they have elected Legislatures, but the Governors are appointed by the President. Each Territory sends a delegate to Congress, who can speak but not vote. In addition to the States and Territories the United States have certain small foreign dominions, which are ruled by Governors appointed by the President with the aid of a local representative body. The **Philippines** and **Porto Rico**, both taken from Spain

in 1898, are the most important. The large island of **Cuba**, acquired at the same time, was afterwards made an independent Republic under American protection.

878. History. The original United States were colonies established by settlers, chiefly from the British Isles, at different times between 1584 and 1732. They continued subject to Britain till 1776, when, in consequence of taxes imposed without their consent, they declared themselves independent.



Fig. 154. Statue of Liberty, at the entrance to New York Harbour.

General Washington was made their Commander-in-Chief, and, after a war of nearly seven years, their independence was acknowledged by Britain in 1782. In 1787 the present form of government was adopted, and in the following year Washington was elected the first President of the Republic. In 1861 several of the Southern States endeavoured to secede from the Union in order to maintain slavery; but after a severe struggle they were subdued and slavery was abolished in 1865. This

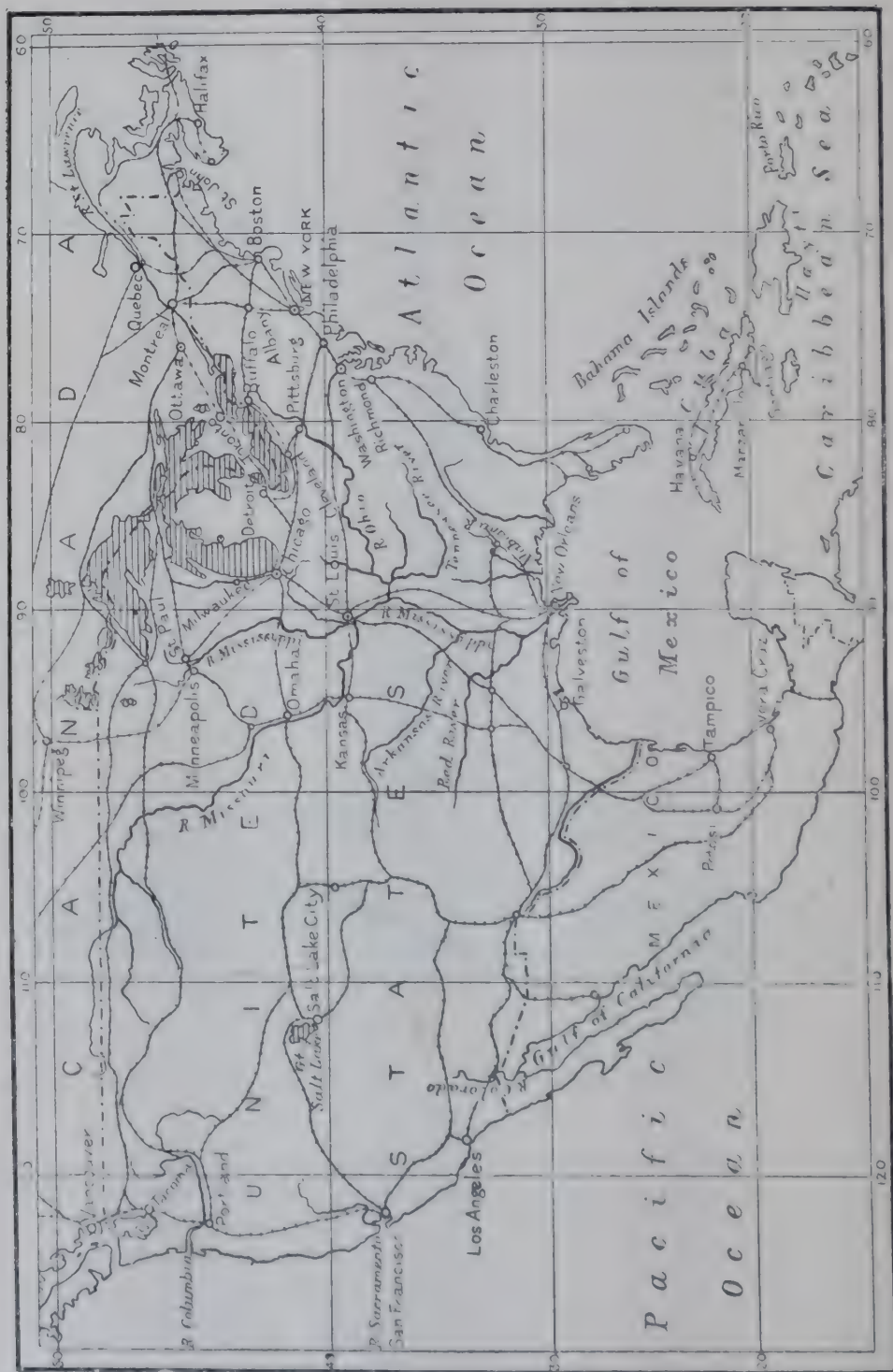


Fig. 155. Railways of the United States.

war, which is known as the American Civil War, is the greatest war in all history, both in the number of troops engaged and the vastness of the operations.

879. **Divisions.** The six Northern or New England States are **Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut.** Maine is as large as all the others put together. Rhode Island, a part of the mainland, is the smallest State in the Union. Massachusetts (the Bay State) is noted for its schools. Vermont is so named from its hills, called the Green Mountains. Connecticut means *long river*.

880. The seven Middle Atlantic States are **New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, and West Virginia.** New York, called the Empire State, has the largest population of any State in the Union, and its commerce is the most extensive. Pennsylvania, named after its founder, Penn., produces large quantities of *iron, coal, and kerosene oil*, and in population and wealth is the second State of the Union. Maryland was named after the Queen of Charles I.; Virginia was first settled by Sir Walter Raleigh in 1584, and was named after Queen Elizabeth, the virgin queen. It is noted for its tobacco. The State was divided during the Civil War.

881. The four Southern Atlantic States are **North Carolina, South Carolina, Georgia, and Florida.** Carolina was named after Charles I.; Georgia after George II. North Carolina produces large quantities of *tar and pitch*; South Carolina is noted for its *rice*; Florida was so called by the Spaniards on account of its beautiful flowers.

882. The twelve North Central States are **Michigan, Wisconsin, Minnesota, Ohio, Indiana, Illinois, Iowa, Missouri, North Dakota, South Dakota, Nebraska and Kansas.** Ohio ranks next to Pennsylvania for wealth and population. Illinois is called the *Prairie State*; Michigan is noted for its copper; Missouri for its iron and coal. Kansas, Minnesota, North Dakota, Nebraska, South Dakota and Indiana are the chief *stock-raising* States. Indiana was so called because Indians were numerous. The Indian names of some of the States have the following meanings: Ohio, *Beautiful River*; Illinois, *Great People*; Michigan, *Great Lake*; Wisconsin, *Wild Rushing River*; Minnesota, *Sky-Blue Water*; Iowa, *Beautiful Land*; Missouri, *Mud River*; Nebraska, *Shallow Water*; Kansas, *Smoky River*.

883. The eight South Central States are **Kentucky, Tennessee, Alabama, Mississippi, Louisiana, Texas, Arkansas, and Oklahoma.** Kentucky has remarkable caves; Alabama and Mississippi are *cotton* States; Louisiana is the chief *sugar* State; Texas is the largest State in the Union. It was annexed to the United States in 1845. It is a *cattle-breeding* State. The farms, called *ranches* or *ranges*, are tended by men on horse-back called "cowboys." The State of Oklahoma is composed of the old Territories known as *Oklahoma* and *Indian Territory*. It was admitted a State in 1906. Kentucky means *The Land Dark with Blood*; Alabama, *Here We Rest*; Mississippi, *Father of Waters*; Texas, *Hunting Ground*.

884. The nine Western States are **Montana, Wyoming, Colorado, Utah, Nevada, Idaho, Washington, Oregon, and California.** Washington, Oregon, and California are on the Pacific Coast, the others are inland. California, Nevada, and Colorado are noted for their *gold* and *silver* mines. California also produces large quantities of *grain* and *fruit*. The name means *hot furnace*, the State being so called on account of its great summer heat. The Yosemite Falls, in California, are half a mile in height. Colorado is so called from the bright colour of its rocks. Utah, admitted as a State in 1896, is mainly a region of inland drainage, and includes an extensive salt desert and the Great Salt Lake.

885. The **Territories** are **New Mexico, Arizona, Alaska, and Hawaii.** **New Mexico** and **Arizona** are dry and mountainous districts lying between California and Texas. **Alaska** was purchased from Russia in 1867. It is a cold and desolate region, inhabited by a few American and European settlers and various Indian tribes, but contains rich *gold fields*, and has valuable *seal* and *salmon fisheries*. **Hawaii** (Sandwich Isles) was annexed by the United States in 1898 and made a Territory in 1900.

886. **Towns.** WASHINGTON (293,000), in Columbia, on the Potomac, is the capital, and the place where Congress meets. It is one of the handsomest cities in the world, and is in nearly the same latitude as Lisbon and Peking. **New York** (3,716,000), on an island at the mouth of the Hudson, is the largest city in America, and the second commercial city in the world. Nearly one-half of the whole foreign trade of the United States passes through New York. Brooklyn and New Jersey, at the opposite

side of the river, are now parts of New York. Brooklyn is united to New York proper by a magnificent suspension bridge. **Boston** (600,000), on the east coast, the capital of Massachusetts, has the largest trade next to New York. The Revolution in 1773 commenced here, and the *Battle of Bunker's Hill* took place in the neighbourhood. *Harvard University*, the oldest



Fig. 156.

in the States, is in a suburb of Boston. Near to Boston is **Plymouth**, where the Pilgrim Fathers landed. **Chicago** (1,873,000), in Illinois, on the southern extremity of Lake Michigan, is an important port and a great railway centre, and has a large trade in provisions. It is now the second city in the States. **Philadelphia** (1,367,000), in Pennsylvania, on the

Delaware, is the third city in the United States. It is a large manufacturing town and a literary and scientific centre.

887. St Louis (612,000) in Missouri, a little below the junction of the Missouri and the Mississippi, is a place of great trade, and, in population, the fourth city in the States. **San Francisco** (356,000), on the Pacific coast, is the largest city in California, and exports large quantities of grain, fruit, wool, gold, and quicksilver. It was recently almost destroyed by an earthquake. **Pittsburg**, on the Ohio, in the west of Pennsylvania, and **Cleveland**, south of Lake Erie, are the chief seats of the iron manufactures. **Buffalo**, on the eastern extremity of Lake Erie, is a place of great importance, being the centre of the trade between New York and the Lake ports. It has also large iron-works. **Detroit** (*The Strait*) is in the strait separating Lakes Huron and Erie. **Baltimore**, in Maryland, on Chesapeake Bay, has large exports of flour. **Richmond**, on the James river, is the capital of Virginia. **Charleston**, in South Carolina, is the chief port in the south-east. **New Orleans**, in Louisiana, founded by the French in 1717, is situated on the Mississippi, and is the seat of the cotton trade. Westward, **Galveston** is the chief port of Texas. **Cincinnati**, on the Ohio, is noted for its pork market and large agricultural exports. **Salt Lake City** is the capital of Utah, and was the chief seat of the Mormons.

MEXICO

888. Mexico lies to the south of the United States and stretches southward till it meets the States of Central America. It extends from sea to sea taking in the whole of the narrowing southern limb of North America. Its area is about 767,000 square miles. The west coast has the long narrow **Peninsula of California** running parallel with it for 900 miles and separated from the mainland by the **Gulf of California**. **Acalpulco**, further south, is the best harbour of the country, and one of the finest in the world. On the eastern coast, in the south the peninsula of **Yucatan** stretches northwards and forms part of the large curve of the Gulf of Mexico. **Tampico**, **Vera Cruz** and **Campeachey** are the best harbours on this coast. The principal river, the **Rio Grande del Norte**, which forms the boundary between the United States and Mexico, flows into the Gulf of Mexico. Long chains of mountains, or *cordilleras*, run from north to south at a little distance from the eastern and western coasts, converging in the south. Between them is a

table-land from 6,000 to 8,000 feet high in the south and sloping gradually to the north. Much of the elevated land has been built up by the outflow of innumerable volcanoes. The highest volcanic peaks are **Orizaba** (18,250 ft.), and **Popocatepetl** (17,520). Nearly a dozen others are over 12,000 ft., and some are of unsurpassed beauty.

889. Climate and Products. The coasts are hot and unhealthy, but the mountain slopes and the plateaux of the interior are temperate and pleasant. The rainfall on the eastern and south-western coasts is abundant, but in the north-west it is deficient and there the summer heat is excessive. The chief rains are in the summer months. The soil is rich, and very fertile when well-watered. There are extensive forests of *firs* on the higher mountain slopes. At lower elevations *mahogany* and *logwood* flourish. The *mangrove*, and various kinds of *cactus*, grow to an immense size in the lowlands of Yucatan. *Maize* and *wheat* are grown in large quantities. *Barley*, *cotton*, *sugar cane*, *hemp*, *tobacco*, *cocoa*, and *coffee* are also grown. Large herds of cattle are raised on the plateaux. Mexico is very rich in minerals, but, owing to the unsettled state of the country, its resources, which include *gold*, *silver*, *copper*, *platinum*, *lead*, *iron*, *antimony*, and *quicksilver*, have been but partially developed. Its silver mines are among the richest in the world.

890. Communications and Commerce. Roads are bad, and many of them are still infested with robbers. There are now about 12,000 miles of railway open. Mexico has no navigable rivers. There is a fair amount of trade along the coast but the foreign trade is comparatively small, amounting to about £27,000,000. The chief **exports** are silver, copper, gold, hemp, coffee, and hides; and the **imports** are machinery, textiles, alcoholic liquors and chemicals. There are few industries, mining and cotton weaving being the chief.

891. People and Government. The total population is about 14 millions. One-third of the people are of **Indian** descent. The **Spaniards**, though not very numerous, are the most influential class; the rest are of mixed race. Almost all are Roman Catholics. Till recently education was much neglected, now it is free and compulsory. *Spanish* is the language commonly spoken. At an early period the country was peopled by the **Toltecs**, a mild and civilized race. They

were conquered by the **Aztecs**, a warlike people who offered human sacrifices to their god of war, Mexitli, from whom the country took its name. Ruins of large temples, pyramids, and palaces erected by them still exist both in Mexico and Central America. They were conquered by the Spaniards under Cortez in 1521. In 1821 the Mexicans declared themselves independent, but their territory has since been much reduced by the union of Texas, California, New Mexico, and Utah, with the United States. Mexico is a **Federal Republic** composed of 30 States, each of which has its own constitution, government and laws. The **President** holds office for six years, and the legislative power is vested in a **Congress** and **Senate**.

892. Towns. MEXICO (344,721), the capital, situated on a beautiful plain, 7,500 feet above the sea, contains some splendid public buildings. It stands in the midst of a grand circle of volcanic mountains, including Popocatepetl. **Puebla**, south-east of Mexico, is the second city in population (93,000). **Guadalajara**, famous for its pottery, is the third. **Leon** is a thriving commercial town of 63,000 inhabitants. **Vera Cruz**, on the Gulf of Mexico is the principal seaport, but, like most of the towns on the Gulf, is very unhealthy.

CENTRAL AMERICA

893. CENTRAL AMERICA is a narrow strip of country lying between Mexico and Panama. Long ranges of mountains run through its entire length, with high tablelands in the north, and a lower plain on the east about midway between the northern and southern limits. In the south the highlands drop to a lower level in the **Isthmus of Panama**. A great many volcanoes are still active, and earthquakes are sometimes very destructive. There are many lakes in the highlands. Lake Nicaragua, the largest of these, is 100 miles long, and from it the **San Juan** river flows into the **Caribbean Sea**.

894. The climate of Central America is very similar to that of Mexico except that the rainfall is heavier. The **Mosquito Coast**, along the north-western borders of the Caribbean Sea, is swampy and very unhealthy. *Silver* mines are numerous but are little worked. *Logwood, indigo, coffee and mahogany*

are the principal products. *Cattle* are raised in the central highland districts. The inhabitants are of the same races as are found in Mexico. Central America threw off the yoke of Spain in 1824, and is now divided into five small **Republics**.

895. GUATEMALA lies south of Mexico and has a population of nearly 2 millions. Its capital, **New Guatemala**, is the largest town in Central America. South of it lies SAN SALVADOR with a population of a million. Eastwards is HONDURAS with a much larger area but a population of only three-quarters of a million. **Truxillo** is a seaport on the Caribbean Sea, and the very ancient town of **Tegucigalpa** is the capital. NICARAGUA extends from the Pacific on the west to the Carribean on the east. Its population is half a million. **Managua** is the capital, but the largest town is **Leon**. More than twenty years ago it was proposed to unite the Atlantic and the Pacific by canals through Lake Nicaragua, but the project is in abeyance. COSTA RICA stretches south-east from Nicaragua to Panama, with a population of only 330,000. **San Jose** is the capital.

896. BRITISH HONDURAS, south of Yucatan, is a small English Colony with large exports of *mahogany* and *logwood*. Its area is 7,500 square miles and its population about 40,000. The chief town is **Belize**.

WEST INDIES

897. The West Indies consist of several groups of islands extending in a double curve between Florida and the mouths of the Orinoco. They are of different geological structure but all are extremely beautiful, and, with the exception of the Bahamas, exceedingly fertile. The principal groups are the **Bahamas**, the **Greater Antilles**, and the **Lesser Antilles**. The *Lesser Antilles* include the **Virgin Islands** in the north, the **Leeward Islands** in the middle, and the **Windward Islands** in the south. The *Greater Antilles* include **Cuba**, **Hayti**, **Jamaica**, and **Porto Rico**. The entire area of the islands is about 95,000 square miles. The population is about 6 millions. About one-sixth are Whites, the remainder are Negroes and Mulattoes. All the islands except Hayti are subject to European or American powers.

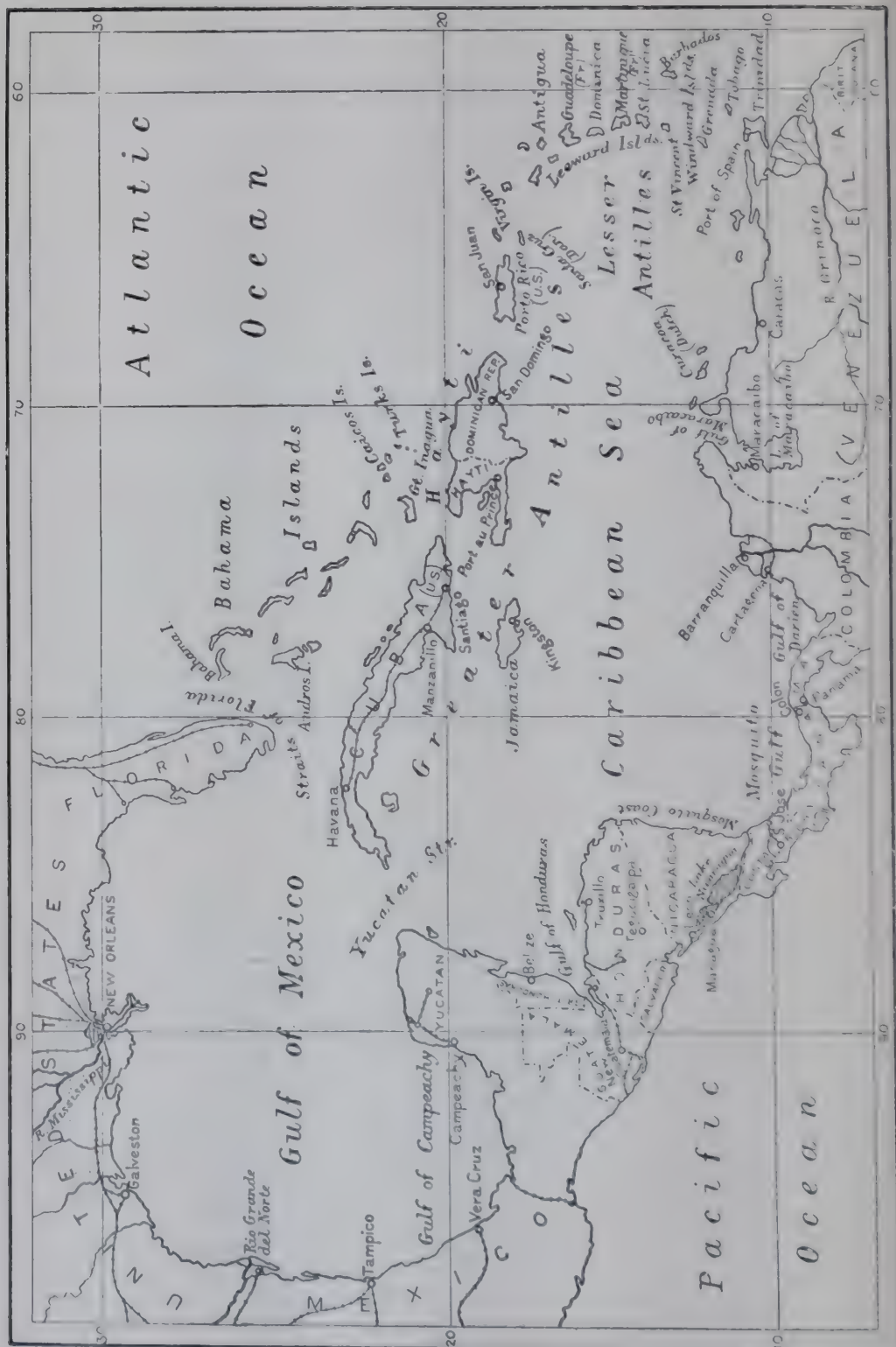


Fig. 157. The West Indies and Central America.

898. Climate, etc. Except in elevated districts the climate is hot, though relieved by daily sea-breezes. Hurricanes are sometimes very destructive and earthquakes are felt occasionally. Several of the islands are volcanic, and eruptions of great severity sometimes occur. In 1902 the town of **St. Pierre**, in the French Island of Martinique, was totally destroyed by an eruption of **Mont Pelée**, and over 20,000 people perished. At the same time there was an eruption of **La Soufrière**, in St. Vincent, an English island, which was still more severe though not so destructive of life.

899. Products and Commerce. *Maize, yams and cassava* are the principal food crops. Yams form the chief vegetable food of the negroes. *Sugar, tobacco, coffee, cocoa and spices* are also largely grown. Sugar cane was the chief source of wealth to some of the islands, especially Jamaica, but the sugar-growing and manufacturing industry has greatly declined owing to the competition of beet sugar. Many fruits, such as *pineapples, oranges, limes, coconuts and bananas* grow to perfection. The chief **exports** are sugar, molasses and rum (principally from Jamaica), tobacco (from Cuba and Hayti) fruits, and coffee. The **imports** are manufactured goods of all kinds, and food-stuffs.

900. **CUBA**, the largest of the West Indian Islands, and **PORTO RICO**, formerly under Spain, were recently ceded to the United States. **Havana**, the capital of Cuba, is a large commercial city with a fine harbour, and is noted for its cigars. Cuba has an area of 36,000 square miles, and is nearly as large as all the other islands taken together. The population is about $1\frac{1}{2}$ millions. Porto Rico has a population of 800,000.

901. **HAYTI**, or **SAN DOMINGO**, is the next largest island. It is divided into two independent Republics, neither being well governed. The **Negro Republic of Hayti** includes the western part of the island and has a population of over a million. The capital is **Port-au-Prince**. The eastern part, with a population of 600,000, forms the Spanish Creole **Dominican Republic**. Its capital is **San Domingo**, the first city founded by the Spaniards in the New World.

902. The *British* islands comprise six Governments. **JAMAICA** lies south of Cuba. It is the largest of the British islands, and has a population of 800,000. **Kingston**, the capital is a flourishing seaport with a population of 40,000. The **Turks**

and **Caicos** Islands are under the Government of Jamaica. The **LEEWARD ISLANDS** lie south-east of Hayti. **Antigua** is the seat of Government. The **WINDWARD ISLANDS** sweep in a curve from Porto Rico to Trinidad. All the islands are under one Governor resident at **St. George's**, Grenada, but each has its own institutions and administration. **BARBADOS**, east of the Windward Islands, is the oldest British possession in the West Indies. The **BAHAMAS**, north-east of Cuba, are a num-



Fig. 158. A Creole Girl.

erous group of small islands upon one of which Columbus first landed. **TRINIDAD**, with an area of 1,754 square miles, lies opposite the mouth of the Orinoco. It is noted for its pitch lake. **Port of Spain**, the best harbour in the West Indies, is the chief town.

903. The principal *French* islands are **Martinique** and **Guadaloupe**. There are also a few small islands belonging to the *Dutch* and the *Danes*.

SOUTH AMERICA

GENERAL VIEW

904. The continent of **SOUTH AMERICA** lies to the south-east of North America with which it is connected by a belt of rocky land at one point less than 50 miles across. This is the **Isthmus of Panama** which separates the Atlantic Ocean on the east from the Pacific on the west. In shape South America strongly resembles Africa, though it is neither so long nor so broad, being not quite 4,000 miles from its extreme northern point, **Cape Gallinas**, to its southern point, **Cape Horn**, and about 3,300 miles in breadth from **Cape Parina** on the west to **Cape Branco** on the east. In area it is about 7 million square miles, and two-thirds of its surface lies within the tropics.

905. **Coast-line.** The coast-line is regular, though less so than that of Africa. There are but few peninsulas, though a great number of small bays; and no very large islands. As in the case of Africa the continental shelf is broadest in the south-east of the continent, where it stretches out into the Southern Ocean for over 500 miles. The **Falkland Islands**, which belong to Britain, are continental islands, and are part of the South American land-mass. A great number of rocky islands, for the most part very small, fringe the south and south-west coasts. The largest of these, **Tierra del Fuego**, forms the extreme southern point of the tapering continent, and is separated from the mainland by a very narrow strait named the **Straits of Magellan**. The western coast is defined by the long range of the **Andes** which runs at no great distance from the water throughout the whole length of the continent. Except in parts of Peru, where the mountains descend abruptly to the sea, there is a narrow coastal plain, widest in central Chile where it varies from 20 to 35 miles. The coast dips quickly and deep waters are soon reached. The only large opening on the western coast is the **Gulf of Guayaquil** in Ecuador. More than 2,000 miles further south lies the natural harbour of **Valparaiso**, the chief port of Chile. About 450 miles west of Valparaiso rise the small islands of **Juan Fernandez**, which belong to Chile, though not to America as a continent.

906. The eastern coast is much more indented than the western. The chief ports are **Buenos Ayres** in the Argentine, south of the La Plata estuary; **Rio de Janeiro** in Brazil, just within the tropic of Capricorn, one of the finest harbours in the world; and **Bahia** nearly 600 miles further north. From Cape Branco the coast-line runs N.W. to the mouth of the **Amazon** which is more than 100 miles broad. For nearly 1,000 miles further the coast of **Guiana** is low, and skirted with dense mangrove swamps as far as the great delta of the **Orinoco**. From this point the northern, or Caribbean, coast is rocky all the way to the **Gulf of Darien**. At the extreme north it is broken by the **Gulf of Venezuela** which communicates with the sea-lake of Maracaibo. The towns along this part are mostly built on the narrow slope towards the sea. The continental islands of **Trinidad** and **Tobago** (belonging to Britain) are separated by a narrow strait from the peninsula of **Paria** north of the Orinoco delta.

907. **Surface.** The most striking feature in the configuration of South America is the vast mountain system of the **Andes**, which run in a series of almost parallel chains, or *cordilleras*, from north to south along the western side of the continent, approaching the water so closely as to leave in some places but a few miles between the sea and the mountains. This chain, which extends almost without a break through the entire length of the continent, is the longest chain in the world. Many of its peaks rise to a height of over 20,000 feet. The highest, **Aconcagua**, in Chile, is 23,080 feet, but **Sorato** and **Illimani** in Bolivia, east of Lake Titicaca, and **Chimborazo** in Ecuador, are not much less. There are a great number of extinct volcanoes, and very many active ones, in this chain, and along its whole course earthquakes are of common occurrence. In the northern portion of the continent, just north of the equator, is the **Plateau of Guiana**, and further south and east the higher and much more extensive **Brazil Plateau**, which occupies most of the eastern projection of the continent.

908. In the centre of the continent is a vast plain, or series of plains, which form the basins of the three rivers Orinoco, Amazon, and La Plata. The plains in the northern part of the continent are called *llanos*, and are covered with green grass for part of the year only. Further south they are called *pampas*, and the vegetation is more abundant. There are few



Fig. 159. South America in relief.

large lakes except **Titicaca**, the northern part of which is in Peru and the southern in Bolivia. Lake Titicaca is situated on a plateau of the same name, and is 12,500 feet above sea-level. It drains into **Lake Aullagas** to the south, which, having no outlet, is salt. At the point on the Isthmus of Panama where South America joins North or Central America, a railway connects the port of Colon (or Aspinwall) on the Atlantic side with the port of Panama on the Pacific side, a distance of about 45 miles. **The Panama Canal** across the isthmus, which was begun in 1881 by a French Company, is now being continued by the United States Government. Such a canal, uniting the Atlantic and the Pacific, will be of immense commercial value. But to the United States it will be of still greater importance from a strategic point of view, since it will give rapid naval communication between its eastern and western coasts.

909. Rivers. The northern portion of the continent is drained by the **Orinoco** which rises in the Colombian, or western, part of the Guiana Plateau. It receives numerous tributaries, and bringing down a large volume of water rich in mud has formed a broad delta through the numerous channels of which it flows into the Atlantic. The highlands of Guiana are separated from those of Brazil by the broad plain of the river **Amazon**, which takes its rise in the high Andes within 30 miles of the Pacific Ocean. It flows at first north, then east, and with its many tributaries, some of which are themselves large rivers, drains an area of 2,500,000 square miles, and empties its vast flood into the Atlantic at the Equator. Though not the *longest*, the Amazon is the *largest* river in the world. Its length is 3,000 miles, and it is navigable for 2,600 miles from its mouth. Its course is mostly over low, flat land, and through dense tropical forests called *selvas*. Its northern tributaries are the **Japura** and the **Rio Negro**. From the south it receives the **Purus**, **Madeira**, **Tapajos** and **Zingu**. Except on the **Madeira**, rapids render the navigation of these tributaries difficult.

910. The basin of the **La Plata** lies south of that of the Amazon. The two great rivers **Paraguay** and **Parana** drain the lower slopes of the Brazil Plateau. They unite at the south-western corner of the State of Paraguay, from which point their joint stream flows south-west, and after receiving

other rivers from the eastern slopes of the Andes, curves to the east forming the **Rio de la Plata**. Shortly before reaching the sea it receives the waters of the **Uruguay** which drains the southern hills of the Brazil Plateau, and for three-fourths of its length forms a political boundary. The volume of water which the Rio de la Plata thus pours into the Atlantic is greater than that of any other river in the world save the Amazon and the Congo. Further south the plains of Patagonia and Argentina are drained by the **Colorado**, the **Negro**, and the **Chubut**, rivers which flow eastwards from the Andes.

911. Climate. About two-thirds of South America lies within the tropics, but being well watered the temperature is not so high as that of similar latitudes in other continents.

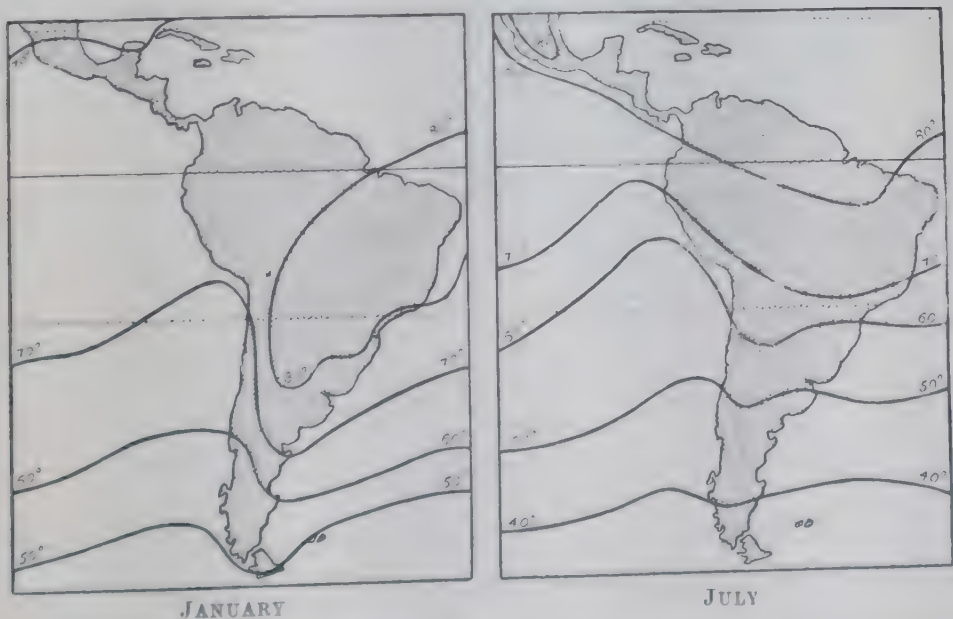


Fig. 160. The Summer and Winter Isotherms.

No part of South America has an average mean temperature of 85°F., a mean which is found both in Central America and India, and very extensively in Africa. The western half of the continent is considerably cooler than the eastern. This is due to the fact that the warm **Brazil Current** flows southward along the east coast, while in the west the cold **Humboldt Current**, flowing from the south, pushes the isotherms sharply northward. The Caribbean coastal plain, where a moist heat prevails almost all the year, is the hottest part of the continent.

912. The rainfall is heavy in the valley of the Amazon, where, accordingly, dense forests prevail. It is heavy also along the coast of Guiana, and abundant over almost the whole of the north and north-east of the continent. East and west of the Andes the conditions as to rainfall differ completely as we pass from north to south. It is the south-east trade winds which bring to the highlands of Brazil and the valley of the Amazon their abundant supply of water.

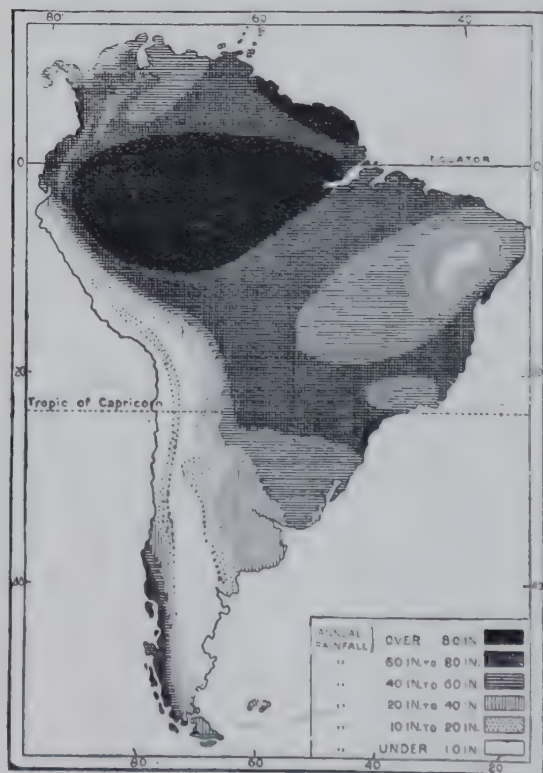


Fig. 161. Average Annual Rainfall.

But the Andes present an impassable barrier to these winds, and the coasts of Peru and N. Chile, having no sea winds, remain dry and barren. The southern part of the continent, however, is within the region of the "roaring forties," or southern anti-trade winds, which blow from the north-west. The south-western coasts, therefore, receive abundant rain, and the Andes once again interpose a barrier which, this time, cuts the rain off from the east. Along the coasts of Guiana and N. Brazil the rains fall in spring and autumn, and

at both seasons are exceptionally heavy.

913. **Vegetation.** On account of its abundant rainfall South America is distinguished for its dense forests with giant creepers, and its rich grassy plains. **Maize, cassava, plantains, sugar, coffee, cocoa, indigo, and cotton** grow in abundance. **Mahogany, logwood, and Brazil-wood** trees are found in the forests. **Palms** are numerous. The **ivory-palm** and **cinchona**, the latter yielding quinine, are natives of this part of the globe.

914. The great South American Plain is divided into the regions of the *llanos* or *savannahs*, in the north; the *selvas* or forest plains in the centre; and the *pampas* in the south. The *llanos* are covered with rich grass at the close of the rainy season; but the vegetation is destroyed during the hot weather, and the ground opens in wide cracks. The forest plains consist of dense jungle. The *pampas* are covered for a great part of the year with tall grass and thistles, which are burnt up in the hot season. Vast herds of cattle are raised on these plains.

915. Animals. The *llama* and *alpaca* are found on the Andes. The *tapir*, *sloth*, *ant-eater*, *armadillo*, and many varieties of *monkeys*, inhabit the forests. The *puma* and *jaguar* are the principal beasts of prey. *Horses* and *cattle* brought from Europe have multiplied exceedingly, and now run wild in various parts. The *condor*, a kind of vulture found on the Andes, is the largest bird of prey. The *rhea*, a kind of small ostrich, is found in the south. *Humming-birds*, some scarcely larger than a bee, are numerous in Brazil and Guiana. *Alligators* and *serpents* are plentiful, and some are of great size. *Bats* are likewise very common. The large *vampire bat* sometimes sucks the blood of horses and mules during the night. One of the most remarkable animals is the *gymnotus*, or electric eel, which stuns its prey with an electric shock. The insects are remarkable for their number, size, and brilliancy.

916. Minerals. The precious metals are found, more or less, all along the Andes, but, on account of the disturbed condition of most of the States, the mines have been greatly neglected for many years. *Gold* and *diamonds* are found in Brazil. Chile produces large quantities of *copper*, as well as of *nitrates*, which occur on the surface of the rainless districts and are collected and exported. *Salt* and *coal* are met with in various parts.

917. People. About one third of the inhabitants are of European descent, chiefly Spanish and Portuguese; the remainder are Indians, Negroes, and mixed races. Spanish and Portuguese are the chief languages. Long before America was known to Europe the people of Peru were comparatively civilized. The *Empire of the Incas* extended over a large part of the west of the continent, and there are many interest-

ing remains of fortified cities, temples, aqueducts and roads, which show that before the Incas were subjugated by the Spaniards they had made great advance in architecture, engineering, and many of the arts of life. In many places Indians still form a large proportion of the inhabitants, and much of the labour of the country is performed by them. The Negroes were formerly slaves, but most of them have been emancipated. In the first half of the 16th century the Portuguese colonised Brazil, and the Spaniards the rest of the continent. In the early part of the 19th century the Spanish colonies revolted and set up Republics. Brazil also became independent of Portugal, and was first made a Kingdom, then an Empire and finally a Republic. With the exception of Guiana, the States of South America are now all Republics. Most of them have suffered greatly from internal dissensions, and are hopelessly in debt. The education of the people is backward everywhere. Roman Catholicism is the prevailing religion.

PANAMA

918. This small Republic was a Department of Colombia till 1903, when it asserted its independence and was upheld by the United States of America. It includes 480 miles of the narrowest part of the isthmus, varying in width from thirty-five to 100 miles. The soil is extremely rich and productive. India-rubber, coffee, cocoa, and fruit, especially bananas, are the chief **exports**. **Panama**, on the Pacific, and **Colon**, or **Aspinwall**, on the Caribbean Sea, connected by a railway, are two ports through which much of the trade with California passes.

COLOMBIA

919. The UNITED STATES OF COLOMBIA, formerly called NEW GRANADA, lie east of the Isthmus of Panama. The area is about 470,000 square miles, and the population is estimated at 4 millions. Three ranges of the Andes traverse the west of the country. The eastern districts consist of llanos. The State is rich in minerals, and both gold and silver are found in considerable quantities. Coffee, tobacco, cotton, and hides are the chief **exports**.

920. **Towns.** **Bogota**, the capital, is a well-built city on a plain nearly 9,000 feet above the sea. The chief commercial towns are **Barranquilla**, connected with the coast by rail, and **Medellin**, the chief mining centre.

ECUADOR

921. **ECUADOR** lies nearly on the equator, whence it derives its name. It is bounded on the north by Colombia, on the south by Peru, and on the west by the Pacific. The area is 116,000 square miles, and the population over 1,200,000. The **Galapagos** (or **Tortoise**) **Islands** lying about 600 miles to the west belong to Ecuador. The east of Ecuador is level. In the west the Andes form a double chain, enclosing a fertile valley. The eastern chain includes **Cotopaxi**, the most terrific volcano in the world, from the crater of which flames sometimes shoot up half a mile in height. **Pichincha**, near Quito, and **Chimborazo** are other lofty peaks.

922. **Towns.** **Quito**, the capital, is situated nearly on the equator, in a beautiful valley 9,500 feet above the sea. **Guayaquil**, in the south-west, is the principal seaport. It is subject to frequent and severe earthquakes, and all buildings, even the churches, are constructed of bamboos and plastered with mud. The chief **export** is cocoa.

VENEZUELA

923. **VENEZUELA** is situated to the east of Colombia, between the Caribbean Sea and Brazil. It embraces two thirds of the basin of the Orinoco, and consists in part of vast llanos which support immense herds of cattle, horses and mules. Coffee, cocoa, and hides, are the chief **exports**. The area is 594,000 square miles, and the population is about 2,300,000.

924. **Towns.** **Caracas**, the capital, is a fine town, 3,000 feet above sea-level. It is connected by rail with its flourishing seaport **La Guayra**. **Maracaibo** is a port in the north-west.

GUIANA

925. **GUIANA** is bounded on the north by the Atlantic, on the south by Brazil, and on the north-west by Venezuela.

The area is about 180,000 square miles, and the population over 350,000. Guiana is the only country in South America now held by European Powers. It is divided into three parts; the east belongs to the French, the middle to the Dutch, and the west to the British. The coasts are low and hot. The rainfall is greater than in any other part of the world except the Khāsi Hills, north of Calcutta. Sugar, rum, molasses, and Cayenne pepper are the principal **exports**. Europeans and Negroes inhabit the sea-board and the interior is occupied by Indian tribes. Guiana does not suffer from either earthquakes or hurricanes.

926. British Guiana includes a full half of the whole country. It is divided into three districts, one of which, **Demerara**, gives its name to the colony. The country is one of great natural wealth, but needs developing. Sugar, cotton, coffee, cocoa, and rice are largely grown. **Georgetown**, a beautiful town at the mouth of the Demerara river, is the capital. **Dutch Guiana** is sometimes called **Surinam**. The capital is **Paramaribo**, on the Surinam river. **French Guiana** is noted for its exports of chillies, called Cayenne pepper. It is swampy and unhealthy, and is now used as a convict settlement. The capital is **Cayenne**, on an island.

BRAZIL

927. **BRAZIL** is bounded on the north by Venezuela and Guiana, on the east by the Atlantic, on the south by Uruguay, and on the west by Paraguay, Bolivia, and Peru. It is an immense country with an area of 3,200,000 square miles, being the fifth largest State in the world. The population is about 14 millions. About one-sixth are whites; the remainder are mixed races, Negroes and Indians. A law was passed in 1871 for the gradual emancipation of the Negro slaves. The interior is peopled chiefly by wandering tribes of Indians.

928. Natural Resources. The **diamond mines** on the upper part of the Francisco River are among the most productive in the world. **Gold** is found in the same district in considerable quantities. Only a small part of the country is under cultivation, the greater part being covered by rich, and in some places almost impenetrable forest. **Coffee, sugar, cotton, tobacco, cocoa, manioc or cassava, rice and wheat**, with **Brazil-**

wood, mahogany and other timbers, are the principal vegetable productions. Half the coffee grown in the world is produced in Brazil. Immense herds of wild cattle roam over the grassy plains. Coffee, cotton sugar, caoutchouc or india-rubber, and hides are the chief **exports**; cotton goods and metals, the chief **imports**.

929. Towns. **Rio de Janeiro** (780,000), the capital, used to be the largest commercial city in South America, but it is now second to Buenos Ayres in Argentina. It is a handsome city and its harbour is one of the finest in the world. It has unrivalled botanic gardens. **Bahia** (200,000) on the Bay of All Saints, was the former capital, and is the second city of the Republic. **Pernambuco** and **Maranhao** are seaports in the north. **Para**, or **Belem**, near the southern mouth of the Amazon, exports india-rubber.

PERU

930. **PERU** is bounded on the north by Ecuador, on the east by Brazil and Bolivia, and on the west by the Pacific. The area is nearly 700,000 square miles, and the population is about 4,600,000. The sea-coast is sandy and arid. The centre is traversed by the double range of the Andes, enclosing elevated table-lands. The eastern part consists of immense plains covered with grass and forests, and drained by the tributaries of the Amazon. On the coast no rain falls, and thunder and lightning are unknown. Peru is the home of the **cinchona** tree, the bark of which, still known as "Peruvian Bark," yields quinine. But the tree is now cultivated in many tropical countries. Formerly Peru had exceedingly rich silver mines, but their yield is greatly reduced. The principal **exports** are silver and copper ore, alpaca wool, cotton, sugar and coffee.

931. Towns. **Lima** (130,000) the capital, seven miles from the sea, is the oldest Spanish town in South America. It was founded by Pizarro in 1535, and the cathedral contains his tomb. Its university is the oldest in America. **Callao** (31,000) is the port of Lima. One of the most wonderful mountain railways in the world now unites Callao and Lima with the silver mines of **Pasco**, **13,720** feet above the sea, the most elevated town in the world. **Arequipa**, inland in the south,

is connected by a railway over the Andes with Lake Titicaca, on which there are now steamers. From Lake Titicaca the railway goes north-west to **Cuzco**, upwards of 11,000 feet above the sea, the capital of the ancient monarchy of the Incas, and containing the remains of a magnificent temple of the sun.

BOLIVIA

932. BOLIVIA lies south-east of Peru, and is entirely inland, having lost in 1884, in a war with Chile, the little strip of the Pacific coast which it formerly possessed. Its area is 703,000 square miles, and the population 1,816,000, chiefly Indians. The two chains of the Andes which contain the lofty peaks of **Sorata** and **Illimani** enclose in the centre a large table-land 13,000 feet in height. The eastern districts form part of the basin of the Amazon.

933. Bolivia is celebrated for the silver mine of **Potosi**, from which silver to the value of £600,000,000 has been obtained during the last 300 years. The produce is now comparatively small. Silver, copper and other metals, india-rubber, cocoa, and coffee are the chief **exports**. **Sucre** (21,000) is the capital, but **La Paz**, connected by rail with Lake Titicaca, is the largest city (57,000). **Potosi**, 13,000 feet above the sea, is now much decayed.

CHILE

934. CHILE, or CHILI, occupies a very long, narrow strip of territory between the Andes and the Pacific Ocean. It extends from Peru to Cape Horn. The area is about 293,000 square miles, and the population 2,980,000. Rain seldom falls in the north but in the south is fairly abundant. Maize, wheat, vines and olives are largely cultivated. Towards the south there are forests of magnificent pine trees. Copper and silver are produced in considerable quantities. The principal **exports** are nitre, copper and silver; the **imports**, cotton goods, sugar, and cattle.

935. **Santiago** (291,000), the capital, is an inland city, in a fertile district. **Valparaiso** (135,000) the port of Santiago, and a large commercial city, is the chief seaport on the west coast of the continent. **Coquimbo**, a seaport in the north, has large exports of copper.

STATES OF LA PLATA

936. The basin of the La Plata is occupied by three republics—**Uruguay**, between the Atlantic and the river Uruguay; the **Argentine Republic**, by far the largest, from the Andes eastwards to the Paraguay and Uruguay rivers; and **Paraguay**, north-east of Argentina.

	Area in square miles.	Population.
ARGENTINE REPUBLIC	1,136,000	5,410,000
PARAGUAY	157,000	630,000
URUGUAY	72,000	930,000

The whole country is generally level and well-watered. In the middle and south there are vast pampas, or grassy plains, abounding with wild horses and cattle. The inhabitants of the plains are chiefly Indians and Gauchos, of Spanish origin, who are expert in using the lasso, a leather thong with a noose at one end, by which they capture wild animals.

937. **Wheat** and **maize** are widely grown. Argentina includes thousands of square miles of the finest wheat-growing land in the world. **Barley** and **sugar** are also grown in all three States. Paraguay is noted for the **mate** (matay) plant, called **Paraguay tea**, which is largely consumed by the inhabitants. Argentina has good railway communications, there being over 12,000 miles of line connecting most of the chief centres of production with the sea. Uruguay has over 1,000 miles; Paraguay only a short line of 130 miles. The **exports** are cattle and sheep, wool, grain, meat, hides, tallow, and bones; the **imports** are cotton and woollen goods, hardware, coal, and oil.

938. **Towns.** **Buenos Ayres** (810,000), the capital of the Argentine Republic, is a large commercial city and seaport near the head of the estuary of the La Plata. **Rosario** is an important railway centre. **Monte Video**, the capital of Uruguay, is situated on the La Plata, and has considerable commerce. **Asuncion**, the capital of Paraguay, is situated near the junction of the Pilcomayo and Paraguay.

PATAGONIA

939. **Patagonia** is the name of the southern portion of the continent east of the Andes, and is included in the Argentine Republic. It is a cold, stony, barren country, thinly inhabited

by savage Indians. Westerly winds and almost constant rain prevail. The Indians live much on horseback and subsist chiefly on the flesh of wild animals. **Tierra del Fuego** is a group of islands separated from Patagonia by the Straits of Magellan, and occupied only by a few Indians. The eastern half belongs to the Argentine Republic and the western half to Chile. **Cape Horn**, on **Hermit Island**, is a steep, dark rock, about 600 feet in height, lashed by almost constant storms and tempests.

OCEANIA

940. The name OCEANIA is commonly used to denote the numerous islands, large and small, which lie to the south-east of Asia immediately north and south of the equator, the island continent of Australia with the neighbouring islands of Tasmania and New Zealand, and the vast multitude of smaller islands which stud the Pacific. The name is convenient if not scientific. Strictly speaking Australasia is, as its name indicates, the southern extension of the great land mass of Asia, and all the islands lying between Australia and the Indo-Chinese Peninsula belong either to the continent of Asia or to that of Australasia. We have already seen (§ 157, 3) that both in fauna and flora there is a sharp dividing line running immediately to the east of Java, Borneo and the Philippines. In comparatively recent geological ages all the islands to the north-west of this line had unbroken land connection with south-eastern Asia, while most of the islands south-east of this line as far as New Guinea were similarly united with Australia. All these islands are in every sense *continental*, and belong either to the northern or southern continental mass. It is most convenient, however, to deal with them in the usual way, grouping the central islands together as the Malay Archipelago.

941. OCEANIA, as thus defined, may be divided into five groups of Islands :—

(1) **Malaysia**, or the Malay Archipelago, including the Sunda Islands, Borneo, the Philippines, Celebes, and the Moluccas.

(2) **Australasia**, including Australia, Tasmania, and New Zealand.

(3) **Melanesia**, including New Guinea or Papua, with numerous smaller islands north-east of Australia and north of New Zealand, the inhabitants of which are closely related dark races.

(4) **Micronesia**, a large number of very small islands north-east of Melanesia.

(5) **Polynesia**, which includes numerous groups of islands in the Pacific between Australasia and Micronesia in the west and America in the east.

MALAYSIA

942. MALAYSIA, or the MALAY ARCHIPELAGO, is so-called because the islands are largely peopled by **Malays**. The original inhabitants were savage negro races, whom the Malays have driven into the interior.

943. The Malays have brown complexions and long black hair. Their houses are made of bamboos, and are generally raised on pillars or built on trees. This is partly for the sake of defence, but chiefly that they may be lifted above the *miasma* that clings to the earth. The Malays are skilful boatmen and many of them engage in sea-faring commerce. They live under the government of petty Sultāns and profess the Muhammadan religion.

944. The islands are generally mountainous and volcanic. *Gold diamonds* and *coal* are found in Borneo; good coal is also obtained in Labuan, a small island belonging to the English. The climate is warm and the rainfall copious, but the general high elevation makes most of the islands pleasant. Vegetation is very luxuriant and the islands are specially noted for their *spices*. *Pepper, nutmegs, cloves, rice, coffee, sugar* and *indigo*, grow in abundance. The *tiger rhinoceros, elephant* and *orang-outang*, are found in many of the islands, and birds of gay plumage are numerous.

945. The **SUNDIA ISLANDS** include **Sumatra** and **Java**, with numerous smaller islands. They are situated along one of the chief lines of volcanic activity (see § 74), and volcanoes, both extinct and active, are exceedingly numerous, especially in Java. Earthquakes also are common. In the year 1772 one of the largest volcanoes was swallowed up, carrying with it several villages. In 1883 a terrible earthquake, with volcanic

eruptions, took place in the Strait of Sunda which separates Java from Sumatra, when the little island of **Krakatoa** was completely destroyed.



Fig. 162. A typical Malayan House.

946. Sumatra lies on both sides of the equator, south-west of the Malay Peninsula from which it is separated by the **Strait of Malacca**. It is a large island having an area of 161,000 square miles. Chains of mountains traverse its whole length. **Mount Ophir** is a lofty peak near the equator. The northern parts of the island are held by Native Chiefs, of whom the Sultān of Acheen is the most powerful. The Dutch are endeavouring to extend their authority over the whole island. Their principal settlements are **Padang** and **Bencoolen** on the

west coast, and **Palembang** on the east coast. *Pepper, camphor* and *coffee* are the chief exports. **Banca** and **Billeton**, islands off the south-east coast belonging to the Dutch, have productive *tin* mines.

947. **JAVA** is the most populous island of the Archipelago, and the chief seat of the Dutch power in the east. It has an area of over 50,000 square miles and a population of about 26,000,000. It is traversed by a chain of mountains containing about forty volcanoes. The soil is exceedingly fertile, as is always the case with volcanic soil when well watered. *Coffee, rice, sugar, pepper, and cinchona* are produced in large quantities. **Batavia**, on the north-west coast, is an important commercial city and the residence of the Dutch Governor-General. **Samarang** and **Surabaya** are flourishing towns on the north coast.

948. **Bali, Sumbawa, Sandalwood Island, Flores, and Timor**, are islands to the east of Java. The inhabitants of Bali still profess Hinduism. Sumbawa is remarkable for the great volcano **Tomboro**. In 1811 a fearful eruption took place, when the explosions were heard in Sumatra at a distance of a thousand miles. The northern half of Timor belongs to the Portuguese, and is now their sole possession in Oceania.

949. **BORNEO**, twice the size of Sumatra, is the fourth largest island in the world. It lies upon the equator, to the north-east of Java. The interior is hilly, but the island contains no active volcanoes. **Kini Balu**, nearly 14,000 feet in height, is the highest point. The climate is agreeable, the heat being tempered by sea-breezes; the soil is fertile, and the island is rich in *coal, gold, and diamonds*. The forests are extensive and are the home of the *orang-outang*. The chief trade of the island is in *tobacco*, which is extensively grown, *camphor*, and edible *bird-nests*, the latter being exported to China. The original inhabitants, called **Dyaks**, are found chiefly in the interior. They are a wild and fierce race, formerly much addicted to piracy. Their most treasured possession consists of the skulls of those they have slain. No young man is allowed to marry till he has presented his bride with a human head in proof of his prowess.

950. There is a nominal Sultān of **Brunei**, in the north, but a number of petty chiefs are the actual rulers. The Dutch claim the greater part of the island. **Pontianak**, in the west,

is their chief settlement. **Sarawak**, south-west of Brunei, is under an English Rājā, who rules with the aid of a council of Native Chiefs. The first Rājā, best known as Rājā Brooke, won the confidence of the Dyaks and did much to abolish their savage customs and put down piracy. His son is now Rājā. **Kūching** is his capital. North Borneo is the territory of the **British North Borneo Company**. **Labuan**, a small island to the north-west belonging to Britain, is now administered as part of the Straits Settlements.

951. THE PHILIPPINE ISLANDS, a numerous and fertile group to the north-east of Borneo, belonged to Spain till a few years ago when they were ceded as a war indemnity to the United States of America. The largest are **Luzon** in the north, **Mindanao** in the south, and **Palawan** in the south-west. *Sugar, tobacco, hemp and rice* are the principal exports. **Manilla**, the capital (350,000), is situated in Luzon, and is noted for its *cheroots*.

952. The **Sulu Islands**, south of the Philippines, are a group of small islands peopled by Muhammadan tribes notorious for piracy. *Pearls* are found in the adjacent seas.

953. CELEBES is an island to the east of Borneo, thrice the size of Ceylon. It produces large quantities of *rice*, and edible *bird-nests* are exported to China. The **Bugis**, the principal native tribe, are superior to all the other races found in Malaysia. The Dutch possess the settlement of **Macassar**, upon the south-west coast, and exercise a certain amount of control over the whole island, which they have made an "out-post" of Java.

954. THE MOLUCCAS, or SPICE ISLANDS, to the east of Celebes, also belong to Holland. They include **Gilolo** in the north; **Ceram**, **Amboyna**, and **Ternate**, in the middle; and the **Banda**, or **Nutmeg Islands** in the south. They are noted for their *nutmegs, mace, and cloves*. These islands are of great commercial value to the Dutch who endeavour to confine the cultivation of the spices to them. Banda, 20 miles in circumference, is a vast grove of nutmeg trees. Amboyna at one time was the exclusive seat of the clove cultivation, the Dutch having extirpated the tree from the other islands. It is now, however, cultivated elsewhere. Mace is the fibrous covering of nutmegs, and cloves are the unopened flower-buds of the plant.

AUSTRALASIA

955. AUSTRALASIA (*Southern Asia*) consists of various islands lying south-east of Malaysia. Of these the largest are Australia, an island so large as to be properly called a continent, Tasmania to the south, and New Zealand to the east. These all belong to the British Empire.

AUSTRALIA

956. AUSTRALIA (*Southern Land*), is the smallest continent, and the largest island in the world. It lies south-east of Asia between 11° and 39° S. Lat. and 113° and 154° E. Long. It is thus confined to the Southern Hemisphere and extends on both sides of the Tropic of Capricorn. It is bounded on the east by the Pacific Ocean; on the west and north-west by the Indian Ocean, on the south by the Southern Ocean. Its area is about 3 million sq. miles, or only a quarter less than Europe. Its greatest length from *Cape Byron* in the east to *Steep Point* in the west, is nearly 2,000 miles.

957. **Coast Line.** The shape of Australia is unlike that of any of the other land-masses of the world. It has few large openings or projections in its coast line, though a great number of small bays. Two notable exceptions occur, one in the north, the **Gulf of Carpentaria**; and the other in the south, the **Great Bight of Australia**. The Gulf of Carpentaria has on its eastern side the long and pointed **York Peninsula**, which ends in **Cape York**, the most northerly point of the island, within 100 miles of New Guinea. From Cape York to **Wilson Promontory**, the most southerly point of the island, is a distance, as the crow flies, of nearly 2,000 miles. Between these two points the east coast sweeps in a vast curve, its rocky outline varied only by a multitude of small bays, some of which form excellent natural harbours. To the south, and separated from the mainland by the **Bass Strait**, lies the continental island of **Tasmania**. From Wilson Promontory the coast turns north-west to the **St. Vincent and Spencer Gulfs**, the latter of which runs inland for 200 miles. Along the Great Bight the coast for 1,000 miles is a dreary stretch of limestone cliffs, unbroken by any river mouth, and **King George's Sound** is the first natural harbour reached. Here the coast turns northward and

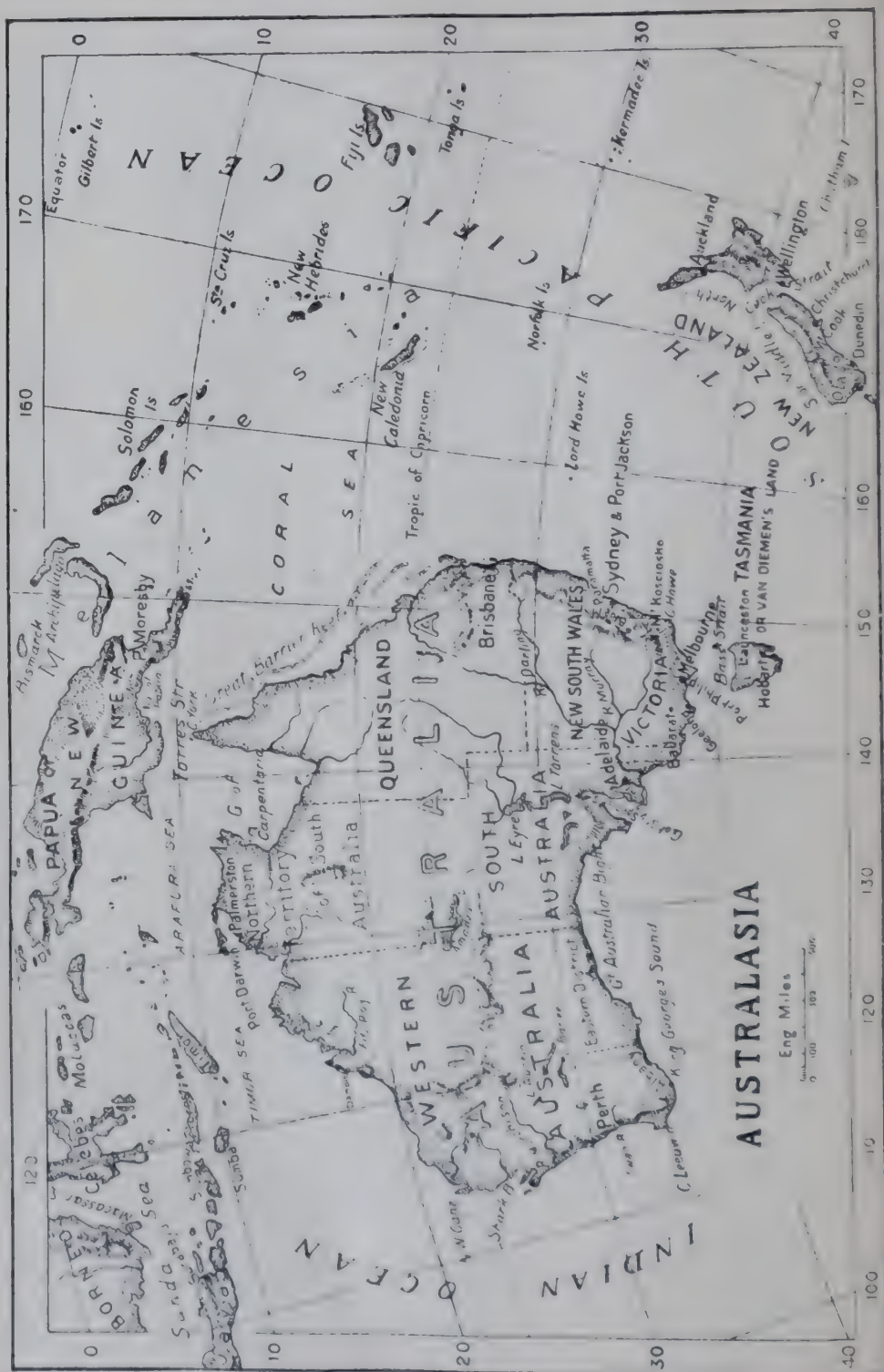


Fig. 163.

beyond the rocky headland of **Cape Leeuwin**, is low and well wooded for nearly 600 miles until the promontory and island which enclose **Shark Bay** are reached. A little north of the Tropic of Capricorn is **North West Cape** from which point a very varied coast line, in parts rocky and in parts low and wooded, runs with many indentations to the broad peninsula of **Arnhem** which projects into the **Arafura Sea** and forms the western coast of the Gulf of Carpentaria. Except Tasmania, Australia



Fig. 164. Australia in relief.

possesses no islands of any importance, although in many parts numerous rocky islets lie close to the coast. A remarkable feature is the **Great Barrier Reef** which extends for 1,000 miles in a south-easterly direction from near Cape York. The Reef is at an average distance of 30 miles from shore and is composed of coral rock. Its outward side is perpendicular.

and channels have been cut through it so that ships may reach the smooth anchorage within.

958. Surface and Drainage. Along the eastern side of the continent a succession of mountain ranges, called the "Great Divide," run from north to south at no great distance from the sea. The highest of these ranges is in the extreme south-east, where one peak of the **Australian Alps, Mount Kosciusco**, attains a height of 7,176 feet. North of the Australian Alps are the **Blue Mountains**. At the northern end these ranges bend westward and gradually open out into a vast table-land which occupies nearly the whole of the western half of the continent. A great deal of the interior is still unknown. The south-eastern part of the central core of the continent is a plain sloping on all sides towards the Spencer Gulf. It was once an inland sea, and now includes the basins of the chief rivers. In the western part of this plain there are numerous lakes, some of which are centres of inland drainage and are therefore salt. The only river of any magnitude is the **Murray** which, with its tributaries, the **Lachlan**, the **Murrumbidgee**, and the **Darling**, drains the slopes of the Australian Alps and Blue Mountains. This is the only river whose waters flow into the Southern Ocean. The rivers of the west have short courses and flow into the Indian Ocean. The most important of them is the **Swan River**. A few flowing from the Great Divide drain the eastern slopes into the Pacific Ocean, among which are the **Burdekin** and the **Fitzroy**.

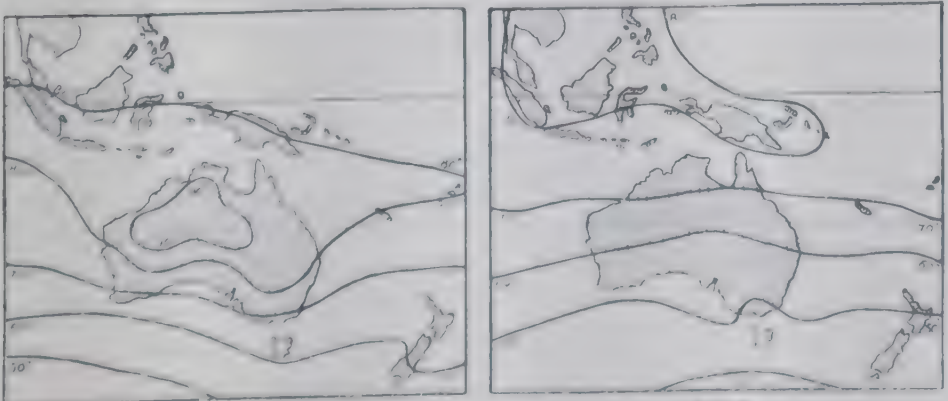
959. Climate. Nearly half the continent is within the tropics, and only along the eastern hilly districts and in the extreme north is the rainfall abundant. In the centre it is very scanty and uncertain. The north-western and central parts are therefore hot and dry, and the heat is increased by the sandy soil and the absence of forests. Severe droughts are common. In the south and east the climate is milder, and most parts are exceedingly salubrious and pleasant, though they are sometimes visited by scorching winds from the interior. The mean annual temperature of the south of the continent is from 60° to 65°F.

960. Natural Products. A great part of the interior consists of sandy deserts, but there are extensive tracts of fine pasture and forest land. Gigantic *ferns* and *gum trees* (various species of *eucalyptus*) are abundant, and many of the latter attain a

height of 300 feet. *Wheat, oats, flax, tobacco* and the *vine* are grown in the south; *rice, cotton* and *sugar* are raised in the north.



Fig. 165. Average Annual Rainfall.



JANUARY

JULY

Fig. 166. The Summer and Winter Isotherms

961. The native quadrupeds are almost all *pouched* (see § 161), and most are of types peculiar to Australia and New Guinea. The largest is the *kangaroo*, and the most common is the *opposum*. The *ornithorhynchus* has a bill like a duck, webbed feet with claws, a body covered with fur, and a broad flat tail. *Sheep*, *cattle*, and *horses*, introduced by European settlers, are now numerous. *Rabbits*, also introduced from Europe, have multiplied so quickly that they are now a serious pest. The *camel*, more recently introduced, is acclimatized in the drier parts and is likely to be of very great service.



Fig. 167. The Ornithorhynchus

962. The *gold-fields* of Australia are among the richest in the world. There are likewise valuable *silver*, *copper*, and *tin* mines. *Coal* is found in several parts. Gold was discovered in Australia in 1851. The value of the annual product was for many years about £12,000,000, but it is now less than half that amount. Wool, gold, wheat, and copper are the principal **exports**. Horses are shipped to India. Woollen and cotton goods, metals, sugar, and tea are the chief **imports**.

963. **People.** The first European settlers were convicts transported from England to Botany Bay on the east coast in 1788. Since 1840 no convicts have been sent, but the population has greatly increased by emigrants from Britain, who find employment in sheep-farming, agriculture, and gold-mining. The entire population exceeds $3\frac{1}{2}$ millions. The

aborigines of Australia belong to the **Oceanic Negrito** race. They do not cultivate the soil, or construct dwellings, but live in the woods on wild animals and roots. They are unacquainted with bows and arrows, but they throw a bent piece of wood called a *boomerang*. It is estimated that their number is only about 50,000, and, in spite of many efforts to improve their condition, they are rapidly dying out.

964. The whole Island is under the British Crown. The six *Crown Colonies*—**New South Wales, Queensland, Victoria, South Australia, Western Australia, and Tasmania**, are now States of the **COMMONWEALTH OF AUSTRALIA**, under a Federal Parliament and a Governor-General, or Viceroy, appointed by the Crown. Each State has a Governor appointed by the Crown, an elected Legislature of two Houses, and a responsible Ministry. The following table gives the area and population of each of these States :—

	Area in square miles	Population 1901
NEW SOUTH WALES	310,367	1,354,000
VICTORIA	87,884	1,201,000
QUEENSLAND	668,497	497,000
SOUTH AUSTRALIA	903,690	363,000
WESTERN AUSTRALIA	975,920	184,000
TASMANIA	26,215	173,000
Total	2,972,573	3,772,000

965. **NEW SOUTH WALES**, the oldest of the States, lies on the east side of Australia. The Blue Mountains run from north to south about forty miles from the sea. Sheep-farming and gold-digging are the principal occupations of the people. **Sydney** (482,000), on Port Jackson one of the finest natural harbours in the world, is the seat of Government. **Paramatta**, also on Port Jackson, is the next oldest town in Australia, and is noted for its oranges. **Bathurst**, 140 miles west of Sydney, is a flourishing town in the centre of a rich agricultural district. **Silverton** has productive silver mines.

966. **VICTORIA** is the smallest but at present the most populous of the Australian States. Prior to 1850 it formed

part of New South Wales from which it is separated by the Murray river. It thus includes the south-eastern extremity of the island. The climate is pleasant and the soil fertile. Victoria is the principal *gold-producing* State of Australia. It also exports more *wool* than any other British possession. **Melbourne**, near the mouth of the Yarra Yarra at Port Phillip, is the capital, and the largest town in Oceania. It has been called the "Queen of the South." It was founded in 1837, and now contains 508,450 inhabitants. **Geelong** is a flourishing town south-west of Melbourne. **Ballarat**, in the west, in one of the richest gold-fields, is next in size to Melbourne.

967. **QUEENSLAND**, occupying the north-east of the island, is the youngest of the States, being the most recent Australian settlement. It is warmer than any of the other States, and grows *rice*, *sugar*, and *cotton*. The chief town is **Brisbane** (125,000) near the mouth of the Brisbane river. Queensland was separated from New South Wales in 1856.

968. **SOUTH AUSTRALIA** formerly included only part of the south coast; it now comprises the entire centre of the island. *Wheat* is the most valuable product, but wine and olive oil are also important. There are some rich *copper* mines. *Horses* for India are raised in the north. The capital is **Adelaide** (171,000), on the Gulf of St. Vincent. **Palmerston**, on Port Darwin, is the northern terminus of the overland telegraph.

969. **WESTERN AUSTRALIA** is the largest of the Australian States, but has at present the smallest population. Much of it is desert, with salt marshes and lakes. Sheep-farming is the chief occupation; but gold-mining promises to become important. The capital is **Perth** (40,000), on the Swan River, on the south-west coast. **Albany**, on King George's Sound, in the south, is a coaling station for mail steamers. The colonization of Western Australia dates from 1820. It was first called the **Swan River Settlement**.

970. **TASMANIA**, or **VAN DIEMEN'S LAND**, is a well-wooded island to the south of Australia, from which it is separated by Bass Strait. It is a hilly country, with a temperate and healthy climate. It has rich *tin* mines. *Coal* and *silver* are also found. **Hobart Town** (25,000), on the south-east coast, is the capital, and has a splendid harbour. **Launceston** is situated on the north side of the island.

NEW ZEALAND

971. **NEW ZEALAND** consists of two large islands, of 44,500 and 58,500 square miles respectively, and known as the **North** and **South Islands**, and one much smaller, **Stewart Island**, in the south. The North and South Islands are separated by **Cook Strait**, of evil repute for tempestuous weather. An almost continuous mountain chain traverses the islands, having peaks covered with perpetual snow, several of which are volcanoes. There are numerous hot springs, especially in North Island, and earthquakes sometimes occur. The islands were discovered by Tasman in 1642; but the first survey was made in 1770 by Captain Cook, who passed through the Strait which bears his name. New Zealand was made a British Colony in 1840, and, like the Australian States, has a Governor appointed by the Crown, and an elected Legislature. The natives, called **Maoris**, are of the Malay race, tall, active, and intelligent. They formerly tattooed their bodies, and were addicted to cannibalism; but civilization has spread among them, and great numbers have embraced Christianity. European settlers now form the majority of the population, which numbers over 850,000.

972. The climate is exceedingly pleasant and healthy. In many respects it is similar to that of England, though not so changeable. The rainfall is abundant, and the soil, being largely volcanic, is very fertile. Both fauna and flora are Australasian. *Wheat* and *oats* are very extensively grown, and the islands are noted for a valuable kind of *flax*. The *pasturage* is good, and vast numbers of *sheep* and *cattle* are bred. Gigantic ferns are common in all the islands, and some of them have edible roots. In minerals South Island is exceptionally rich. There are productive *gold*, *silver*, and *coal* mines. The chief **exports** are wool, wheat, frozen meat, hides, tallow, butter and gold.

973. **Wellington** (49,000), in North Island, on Cook Strait, is the seat of Government. **Auckland**, also on North Island, was the former capital, and is still a great centre of commerce and shipping. **Dunedin**, at the head of Otago Bay on the east coast of South Island, is now the chief commercial town. There is a flourishing **University of New Zealand**, with Colleges at all these towns.

974. Included in the Colony of New Zealand are the **Henry Islands**, in the Eastern Pacific, a group of very fertile islands with a population of about 6,000. They export *coffee*, *copra*, and *fruit*. The small **Kermadec Islands**, 500 miles to the north of New Zealand, and the **Auckland Islands**, 500 miles to the east, are all rocky and barren.

MELANESIA

975. MELANESIA comprises **New Guinea**, or **Papua**, a large island to the north of Australia, together with a number of smaller islands adjacent to it. They are grouped together because they are all inhabited by a very dark-skinned race



Fig. 168. Typical Papuans.

of the **Oceanic Negrito** type who are called *Papuans*, from the fact that their hair is in curly tufts (*papua*, curly-haired). The largest of the islands takes its name from the race. The Papuans, in their native state, are a wild and uncivilized people, addicted to cannibalism.

976. **NEW GUINEA**, or **PAPUA**, lies immediately south of the equator, and has an area of over 300,000 square miles. It is separated from Australia by the **Torres Straits**, about 90 miles wide, named after their discoverer, a Portuguese who first sailed through them in 1606. Papua is one of the least known parts of the world. The interior of the island is traversed by a chain of mountains known as the **Owen Stanley Range**, in which **Mount Victoria** rises to a height of about 13,200 feet. The chief river is the **Fly**, which is navigable for 500 miles from its mouth and has formed a large delta in the **Gulf of Papua**, south of the island.

977. The climate is essentially tropical and insular. The range of temperature on the plains is small, the average winter temperature not falling below 75°F . and the summer heat seldom exceeding 95°F . The rainfall is very copious, varying along the coasts from 80 to 120 inches a year, and being still heavier on the mountains. The rocks are chiefly igneous in character, and the soil is consequently very rich, and admirably adapted for the cultivation of *rubber*, *cotton*, *sugar-cane*, *tobacco*, and *coffee*, all of which are grown, and some of which are indigenous. In the interior are vast forests in which *ebony* and *cedar* are found. The fauna of the island is Australasian, its mammals being small and pouched. Little has so far been done to develop the resources of the island. *Yams*, *bananas*, and the *coconut*, abound. Rubber and tobacco are produced, the former being largely collected in the forests. *Alluvial gold* is also found, and forms one of the main exports.

978. The Dutch have long claimed the western part of the island. England has annexed the south-eastern peninsula, the coasts of the Gulf of Papua, and a large stretch of the interior. **Port Moresby**, in the south-east, is the chief settlement and a growing port. The Germans have taken the north-east coast, which together with the adjacent **Bismarck Archipelago** and part of the **Solomon Islands**, is now known as **Kaiser Wilhelm's Land**.

979. The **Solomon Islands**, **Santa Cruz**, the **New Hebrides**, the **Loyalty Islands**, and **New Caledonia**, are a string of volcanic islands forming a festoon enclosing the **Coral Sea**, and closely resembling the festoons of Eastern Asia. They continue the same line of weakness to the southern tropic. The northern islands of the Solomon group belong to Germany. The south-

ern Solomons, with Santa Cruz and many smaller islands to the west, belong to Britain. The New Hebrides and some hundreds of little islands in their vicinity are under the control of a joint English and French Commission. New Caledonia and the Loyalty Islands belong to France, and the former is used as a convict settlement.

980. The FIJI ISLANDS, more than 200 in number, are a more important group 800 miles east of the New Hebrides and New Caledonia. Their total area is about 8,000 square miles. They were ceded to the British by the native King in 1876, and now form a prosperous Crown Colony. Long



Fig. 169. A small island in the Bismarck Archipelago. It is a type of many hundreds of the smaller Pacific islands, and consists of the cone of an extinct Volcano.

before that time, however, British settlements had been established. The climate is tropical, but pleasant and very healthy, and the islands are extremely productive. *Rubber, sugar, tobacco, copra, and timber* are the chief products. The total population is about 130,000 including 2,500 Europeans. The natives of the islands have almost all become Christian, and are a rapidly advancing community. Fiji is administered by a British Governor who is also High Commissioner for the Western Pacific. The chief towns are **Suva** and **Levuka**, both of which have excellent natural harbours.

MICRONESIA

981. MICRONESIA, the *Region of Little Islands*, embraces a large number of small islands to the north-east of Melanesia. The **Ladrone**, or **Marianne Islands**, the **Carolines**, and the **Gilbert Islands**, are the principal groups. The Ladrone Islands, discovered by Magellan in 1521, were so named by him from a word signifying *thieves*, on account of the pilfering propensities of the natives. They were afterwards called the Marianne Islands in honour of a Queen of Spain. The Carolines were named after Charles II. of Spain. Both groups were lately sold by Spain to Germany. The Gilbert Islands are a group of very small islands belonging to Britain.

POLYNESIA

982. POLYNESIA (*Many Islands*) comprises the numerous groups of islands which lie in the Pacific between Malaysia and Australasia on the west, and America on the east. The larger islands contain lofty mountains, some of which are volcanoes; while others, reared by the coral insect, are low and almost level with the surface of the ocean. The coral islands are generally of circular or semi-circular form, consisting of a low belt, or reef enclosing a lagoon of smooth water, connected with the ocean outside by an opening in the reef. Such islands are called *Atolls*. In many cases a belt of coral surrounds a mountainous island, enclosing a channel of deep water between itself and the shore.

983. The climate is very pleasant, the heat being moderated by the sea and the ample rainfall. The soil is generally fertile. The *bread-fruit*, *coconut*, *yam*, *sweet-potato*, *taro root*, and *banana*, are the principal vegetable products. A native cloth is made by beating the bark of certain trees until it becomes soft and pliable. The inhabitants belong to the Malay race, but are tall and well formed. They are in general indolent, but courageous and fierce in war. Their contests have been carried on with such barbarity that some islands have been almost depopulated. Cannibalism and infanticide are still practised in many of the islands, and human sacrifices are occasionally offered. In others Christianity has been introduced and has made great progress.

984. The **Sandwich Islands**, now commonly called the **Hawaiian Islands**, were governed by native rulers till they were annexed by the United States of America, and made a "Territory" in 1898. They are about 3,000 miles west of Mexico, and are the most important of the Polynesian Islands. They were discovered in 1778 by Captain Cook who was afterwards killed at Hawaii, and were named after Lord Sandwich, then first Lord of the Admiralty. **Hawaii**, the largest island, about one-fifth the size of Ceylon, is remarkable

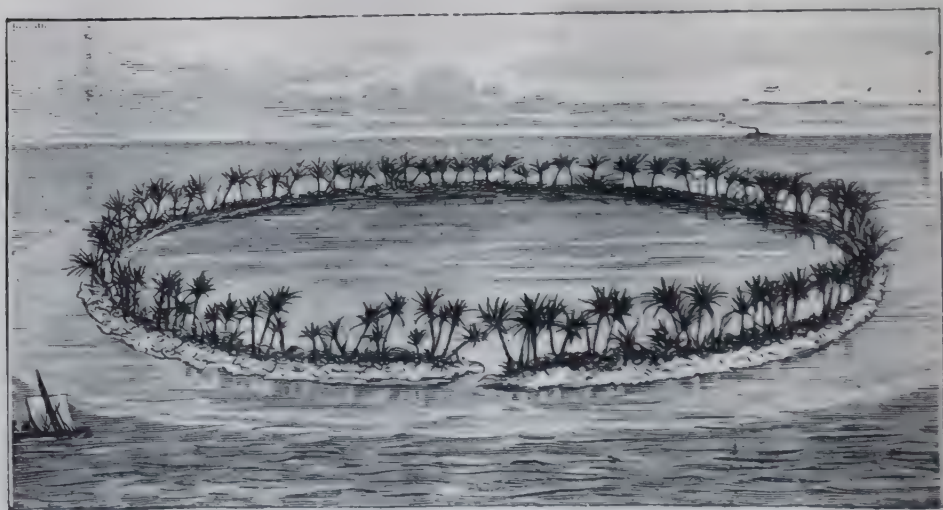


Fig. 170. The island of *Tatakotoroa* in the Low Archipelago.
A typical *Atoll*.

for its lofty peaks and magnificent scenery. **Mowna Kea**, the highest mountain in Oceania, is 13,953 feet above the sea. **Kilauea**, or **Mowna Loa**, is the largest active volcano in the world. The crater, which at ordinary times may be safely viewed, has been described as "a lake of molten lava, 3 miles wide, rolling in waves of fire." (See Fig. 30.)

985. About 60 years ago the inhabitants of the Sandwich Islands were savages, without any written language. Now they are civilized and have embraced Christianity, and schools and churches are found everywhere. The capital is **Honolulu**, a handsome town of about 40,000 inhabitants, and the chief port of call in the Pacific.

986. The **Tongas**, or **Friendly Islands**, lie nearly 2,000 miles east of Australia. Their total population is a little over

20,000. They are governed by a King with an elected Assembly, and are under British protection. The **Samoas**, or **Navigator Islands**, lie to the north-east of the Tongas. They were at one time a British Protectorate but are now divided between the United States and Germany. The **Society Islands** lie nearly midway between Australia and South America. They are lofty and beautiful, and next to the Sandwich Islands in importance. **Tahiti** is the largest. All the inhabitants have embraced Christianity. The **Marquesas** are a group to the north-east of the Society Islands. The **Low Archipelago** consists of an immense number of small islands to the eastward of the Society Islands. All these now belong to France.

ANTARCTICA

987. ANTARCTICA is the name given to the vast land-mass which is believed to surround the South Pole. Ships sailing due south in the Southern Ocean find, in every longitude, plain evidences of the approach of land between 60° and 75° S. Lat. The sea grows shallower, and on its bed fragments of rock are discovered of such kinds as are only found in the neighbourhood of continental land. These fragments have evidently been brought down by the Antarctic glaciers. In many places land itself has been reached and high mountain chains have been discovered. For the most part, however, the land is surrounded by an impenetrable ice barrier, and is covered by an "ice cap," the thickness of which varies from a few hundred feet to several miles. From a multitude of observations it has been estimated that Antarctica has an area of not less than $3\frac{1}{2}$ million square miles.

988. Comparatively little was known of Antarctica till within the last few years. Captain Cook crossed the Antarctic Circle for the first time in 1773. About 1841 Sir James Ross reached land almost due south of New Zealand between latitudes 70° and 78° S. which he named **Victoria Land**. He discovered two great mountains now called **Mount Erebus** and **Mount Terror**, the former being an active volcano over 12,000 feet high. From that time for half a century very little more was learnt, although the crews of various vessels effected landings on different sides of the Antarctic continent.

The German Deep Sea Expedition, and a British expedition equipped by Sir G. Newnes, made some valuable discoveries towards the close of the nineteenth century. Since then several expeditions of discovery have been sent out by England, Germany, France, and Sweden. Captain R. F. Scott, of the British expedition, after a long and toilsome journey across the ice on sledges, reached the most southern point yet attained, $82^{\circ} 17' S$. He discovered land stretching south and east of Mount Erebus.

989. The lands of Antarctica are everywhere destitute of human beings, but the shores are frequented by the *albatross*, and a great number of *penguins*, *seals*, and *walruses*, while *whales* abound in the neighbouring sea. **Graham's Land** lies over 600 miles due south of Tierra del Fuego. It was discovered many years ago, and the western coast was explored by a Belgian expedition in 1898. The **South Shetlands** and **South Georgian Isles** are fog-swept groups of barren islands to the north-east of Graham's Land. **Enderby Land** lies south of Madagascar and on the Antarctic Circle. It has often been sighted, but very little is as yet known of it.

990. The northern limit of **Victoria Land** is about $71^{\circ} S$, from which point the coast runs almost due south until a latitude of 78° is reached. It then turns eastwards. Captain Scott explored the eastern portion of this coast for about 450 miles, and named the land **King Edward VII. Land**. The two mountains, Erebus and Terror, are near the angle of the coastline. Inland, at Lat. $83^{\circ} S$, a chain of mountains over 15,000 feet high were seen.

991. **Kerguelen Island**, sometimes called the **Isle of Desolation**, lies only about $49\frac{1}{2}^{\circ} S$, and can hardly be considered to belong to Antarctica. It is in the same longitude as Cape Comorin, and is only slightly to the south of a line drawn from the Cape of Good Hope to Tasmania. A party of astronomers lived for some months on this island in 1874 in order to take observations of the transit of Venus. There is hardly any vegetation and the rocky coasts resemble those of Norway. The island was annexed by France in 1893.

APPENDIX I.

THE PRINCIPAL COMMERCIAL PRODUCTS, WITH THE CHIEF COUNTRIES FROM WHICH THEY COME.

N.B.—The countries are named in the order of their produce.

- Alpaca** (hair of the Alpaca and Vicuna), S. America, chiefly Peru and Chile. A similar soft hair is obtained from the Angora goat which is bred in Asia Minor.
- Alum**, the Punjab and S. America.
- Aluminium**, United States, Switzerland, France.
- Arrowroot**, the West Indies (chiefly Jamaica) and the Bermudas. Grown to some extent in most tropical countries.
- Asafœtida** (a gum-resin, used in medicine), Persia and Kafiristan.
- Asbestos** (a fire and heat proof mineral), from Canada, New South Wales and Italy.
- Asphalt** (a mineral pitch), Trinidad, France and Switzerland.
- Bamboos**, most tropical countries, chiefly India, Ceylon, Burma and China.
- Barley**, Russia, Germany, United States, Austria-Hungary, India, United Kingdom, Spain.
- Borax**,—California, Chile, Tibet and W. China.
- Brandy** (distilled from Wine), France, Spain, Portugal.
- Butter**, Denmark, Sweden, Holland, France, Canada, Siberia.
- Camphor**, China, Japan, Formosa, Sumatra, Borneo.
- Caoutchouc** (India rubber), Tropical Africa, Brazil, India.
- Cardamoms**, Travancore and Cochin.
- Cayenne Pepper**, Guiana.
- Castor Oil**, the Levant, West Indies, Central America.
- Cheese**, Denmark, Holland, United States, England.
- Cinchona** (or Peruvian Bark), Java, India, South America, Ceylon.
- Cinnamon**, Ceylon, Java, Sumatra.
- Cloves**, the Moluccas, Zanzibar and Indo-China.
- Coal**, Great Britain, United States, Germany, France, Belgium, Austria-Hungary, Russia, Japan, Canada, New South Wales.
- Cocoa**, Ecuador, Brazil, E. Indies, Central America, Gold Coast, Ceylon.
- Coconuts**, along most tropical sea coasts, esp. India, Ceylon, W. Africa, and Burma.
- Coffee**, Brazil, Colombia, Java, Venezuela, Guatemala, India and Ceylon, W. Indies.
- Copper**, United States (Michigan), Mexico, Spain and Portugal, Australasia, Japan, Chile.
- Cork** (bark of a tree), Spain and Portugal.
- Cotton**, United States, India, Egypt, China.
- Currants** (small dried grapes), Ionian Isles and Greece.
- Dates**, Persia, Syria, Egypt, Tripoli.
- Diamonds**, South Africa yields 98 per cent. of the world's supply. A few come from Brazil, British Guiana, and N.S. Wales.
- Dried Fruits**, California, Persia, Asia Minor, N. Africa.

- Ebony**, Ceylon, Burma, Travancore, W. Africa.
- Esparto Grass** (used for making paper), N. Africa and Spain.
- Figs**, Spain, Portugal, and the Levant.
- Flax**, Russia, Austria-Hungary, Germany, Poland, France, Italy.
Russia produces two-thirds of the whole world's supply.
- Furs** (of many kinds), Northern Canada and Siberia.
- Gall Nuts** (used in making ink), Asia Minor, Persia, China, Japan.
- Ginger** (a dried root), China, India, W. Africa, W. Indies.
- Gold**, Transvaal, United States, Australia, Siberia, Canada, Mexico, India.
- Guano** (the excreta of sea-birds, a manure), S. American Coasts, West Indies and other Islands.
- Gum Arabic**, West and South Africa, Barbary States, Tripoli.
- Hemp**, Russia, Mexico, Italy, Austria-Hungary, France.
- Honey**, Greece, Asia Minor, Ionian Isles, Turkey, and, to some extent, most of the warmer temperate countries.
- Indigo**, India (esp. Bengal, Behar, Madras, Agra), China, Japan, Egypt, S. America.
- Iron**, United States, Germany, Great Britain, Russia, Spain, Sweden, Austria, France, and in smaller amounts from most other countries. The increase of production in the U.S. and Germany has been very rapid. Since 1870 the U.S. has increased its production ten-fold and Germany six-fold.
- Ivory**, East, West and Central Africa; India and Burma.
- Jute** (a valuable fibre), Bengal.
- Lead**, United States, Spain, Germany, Australia, Mexico.
- Logwood** (a dye), British Honduras, Mexico, South America, the West Indies.
- Maize**, N. and S. America, India, Persia, Syria, Austria, France, Spain, Italy, Turkey.
- Mercury** (Quicksilver), Austria, Spain, China, Tibet.
- Millet**s (food grains), India, China, Arabia.
- Marbles** (various), Burma, Spain, Italy.
- Mustard**, S. Europe generally and England.
- Nutmegs** (a spice), Malay Isles, Borneo, W. Indies.
- Oats**, N. Europe, Scotland, Canada, New Zealand.
- Olives**, Cyprus, Spain, Italy, N. Africa, Austria.
- Olive Oil**, Ionian Isles, Tunis, Algeria.
- Opium**, India (esp. Behar, Malwa and Agra), S.W. China, Persia.
- Oranges**, Spain, N. Africa, California, Malta, the Azores.
- Palm Oil**, West Africa.
- Pearls**, Western Australia, Dutch East Indies, Queensland, Ceylon, Persia, W. Indies.
- Pepper**, Sumatra, Java, Borneo, W. Africa.
- Petroleum**, United States, Russia (Baku), Burma, Japan, Roumania, Germany.
- Platinum** (a valuable metal), Siberia, Russia (Ural Mts.).
- Plumbago**, Ceylon, United States (N.Y. State), Canada, Siberia, England (Cumberland).
- Rice**, China, India, Burma, Java, Japan, Indo-China.
- Raisins** (dried grapes), Turkey and Asia Minor.

Salt, Austria, Hungary, England and Germany. Also obtained from sea-water almost everywhere.

Saltpetre, Chile, Peru, India (Central India, Rajputana).

Sandalwood, Mysore, Travancore, South Sea Islands.

Silk, China, Japan, Italy, Turkey-in-Asia, France, Persia.

Silver, Mexico, Nevada, California, Bolivia (Potosi), Australia, Germany, Chile, Canada, Peru.

Spices (generally) Dutch East Indies, India, Sarawak, Zanzibar, Ceylon.

Sponge, the Levant, Florida, Ceylon, and the Bahamas.

Sugar (from **Sugar Cane**) India, Java, United States, Cuba, Hawaii, Brazil, Argentina, W. Indies.

Sugar (from **Beetroot**), Germany, Austria-Hungary, France, Russia, Sweden, United States, Belgium.

Sulphur, Sicily, California.

Tar (vegetable), Norway, Sweden, United States (N. Carolina).

Tea, China, India (Assam, Bengal), Ceylon, Japan, Java.

Timbers. **Teak**, Burma, Travancore; **Pine**, Norway, Sweden, Russia, N. America; **Oak**, **Ash**, **Walnut**, England, France, Germany, Russia, N. America; **Rosewood**, Brazil, Java; **Mahogany**, Mexico, Burma, Central and South America.

Tin, Burma, Malay Peninsula, England (Cornwall), Germany, Australia.

Tobacco, United States (Virginia), India, Cuba, Russia, Dutch East Indies, Germany, Brazil.

Wax, Greece, Asia Minor, Turkey, Ionian Isles.

Wheat, United States, Russia, France, India, Italy, Spain, Austria-Hungary, Germany, Canada, Argentina.

Wines, France, Italy, Spain, Austria-Hungary, Algeria, Portugal, Germany, Australia, California.

Wool, Australia, Germany, England, Argentina, S. Africa, New Zealand, Russia.

Zinc, Belgium, Great Britain, Germany (Silesia), United States.

APPENDIX II.

LENGTH OF DEGREES OF LONGITUDE AT DIFFERENT DEGREES OF LATITUDE.

Lat. N. or S.	Statute Miles.	Lat. N. or S.	Statute Miles.	Lat. N. or S.	Statute Miles.
Equator	69.17	30	56.79	60	34.67
5	68.91	35	56.72	65	29.31
10	68.12	40	53.06	70	23.71
15	66.79	45	48.99	75	17.96
20	63.02	50	41.53	80	12.03
25	62.73	55	39.76	85	6.04

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Countries and States are printed in small capitals (e.g. *ABYSSINIA*) and physical subjects in italics (e.g. *Cyclones*). The following abbreviations are used:—*t.* town, *r.* river, *str.* strait, *l.* lake, *i.* or *isls.* island or islands, and *mt.* or *mts.* mountain or mountains.

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